BACHELOR THESIS – ME 141502

FEASIBILITY STUDY OF RE-OPERATING KM. MINA JAYA NIAGA 11 AS TUNA LONG LINER FISHING VESSEL

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DOUBLE DEGREE PROGRAM OF
MARINE ENGINEERING DEPARTMENT
Faculty of Marine Technology
Institut Teknologi Sepuluh Nopember
Surabaya 2017

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SKRIPSI – ME 141502

STUDI KELAYAKAN PENGOPERASIAN KEMBALI KM. MINA JAYA NIAGA 11 SEBAGAI KAPAL LONG LINER PENANGKAP IKAN TUNA

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APPROVAL FORM

Feasibility Study of Re-operating KM. Mina Jaya Niaga 11 as Tuna Long Liner Fishing Vessel

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Proposed to Fulfill One of the Requirements for Obtaining a Bachelor Engineering Degree
on
Reliability, Availability, Management and Safety (RAMS) Laboratory
Study Program Bachelor Double Degree of Marine Engineering Department
Faculty of Marine Technology
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SURABAYA
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FEASIBILITY STUDY OF RE-OPERATING KM. MINA JAYA NIAGA 11 AS TUNA LONG LINER FISHING VESSEL

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ABSTRACT

The projects Mina Jaya Niaga fishing vessel are unsuccessful. 34 vessels are planned to be build but only 16 were able to be finished. On recent year, government through the Minister of Maritime Affairs and Fisheries planned to re-activated the vessels again. Based on the survey there are 5 vessels which still in good condition and feasible enough to be repair. One of the vessels is Mina Jaya Niaga 11. Having the advantage of being a maritime country make Indonesia rich in marine biodiversity, especially for tunas, there are many tuna species can be found in Indonesian Sea. The demand for tuna fishes in the market is growed as Tuna is the most high-value marine commodity and popular among the world. On this final project the capital expenditure, operation expenditure along with the revenue in the given scenario is examined. The vessel will be planned to operate in Fisheries Management Area 715 (FMA-715) with Bitung as home port for landing catches. The study shows that the total capital expenditure is Rp. 9,867,720,095.47 and the total operation expenditure is Rp. 2,306,680,848.00 per trip with the income of Rp. 3,907,935,674.05 per trip. The feasibility data analysis show with 5 years period of project the NPV is Rp. 689,580,340.41, IRR rate is 16%, Net B/C Ratio is 1.04 and the payback period of the project is 3.69, less than 5 years.

Keywords: Mina Jaya Niaga, Tuna Fisheries, Tuna Long liner, Feasibility Analysis, NPV, IRR, Net B/C, Payback Period

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STUDI KELAYAKAN PENGOPERASIAN KEMBALI KM. MINA JAYA NIAGA 11 SEBAGAI KAPAL LONG LINER PENANGKAP IKAN TUNA

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ABSTRAK

Proyek pengadaan kapal Mina Jaya Niaga tidak berlangsung lancar. Dari 34 kapal yang rencananya akan dibuat, hanya 16 kapal yang dapat terselesaikan. Pemerintah melalui Kementrian Kelautan dan Perikanan memiliki rencana untuk mengaktifkan kembali kapal-kapal ini. Berdasarkan survey yang telah dilakukan, terdapat 5 kapal yang masih dalam kondisi cukup baik dan layak untuk kemudian dapat diperbaiki. Salah satunya adalah kapal Mina Jaya Niaga 11. Indonesia sebagai negara maritime sangat memiliki potensi dalam hal keanekaragaman hayati laut, terutama untuk ikan Tuna, ada banyak spesies ikan Tuna yang dapat ditemukan di laut Indonesia. Permintaan pasar untuk ikan Tuna sedang bertumbuh karena ikan Tuna merupakan komoditas maritim yang sangat tinggi nilainya dan popular di seluruh dunia. Pada tugas akhir ini pengeluaran modal, pengeluaran operasi dengan pendapatan pada skenario yang sudah ditentukan, dianalisa. Kapal ini direncanakan akan beroperasi di Wilayah Pengelolaan Perikanan 715 (WPP-715) dengan Pelabuhan Bitung sebagai pelabuhan tempat pendaratan ikan. Hasil studi menunjukan total pengeluaran modal yang dibutuhkan adalah Rp. 9,867,720,095.47 dan total pengeluaran operasi adalah Rp. 2,306,680,848.00 per perjalanan dengan pendapatan Rp. 3,907,935,674.05 per perjalanan. Hasil analisa kelayakan menunjukan dengan periode selama 5 tahun, NPV dari proyek adalah Rp. 689,580,340.41, rataan IRR sebesar 16%, Net B/C Ratio adalah 1.04 dan periode pengembalian dari proyek yaitu pada tahun ke-3.69, kurang dari 5 tahun.

Keywords: Mina Jaya Niaga, Perikanan Tuna, Tuna Long liner, Analisa Kelayakan, NPV, IRR, Net B/C, Payback Period

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PREFACE

First of all, the writer want to give thanks to the God Almighty for the gracious mercy and tremendeous blessing which enables the writer to finish this bachelor thesis.

This thesis report entitled "Feasibility Study of Re-Operating KM. Mina Jaya Niaga 11 as Tuna Long Liner Fishing Vessel" is submitted to fulfill one of the requirements in accomplishing the bachelor degree program at Marine Engineering Department, Faculty of Marine Technology, Institut Teknologi Sepuluh Nopember Surabaya. There are lots of supports which enable the writer to finish this research study. Therefore, on this section the writer would like to thank to all people who has support the author for accomplishing this bachelor thesis, among others:

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This Final project still has a lot of deficiency. Therefore any comment or suggestions are welcome for completing this final project. Last, the writer hope that this final project will have benefit to the readers.

Surabaya, July 2017

Danuja Wijayanto

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CHAPTER I
INTRODUCTION

1.1 Problem Background

Mina Jaya Niaga 11 fishing vessel is one of the 31 vessel which originated comes from Mina Jaya Niaga project procurement. The program was intended to strengthen Indonesia's maritime sector. Through this project, on 1996, Indonesia government bought 31 tuna longliner shipset from Spain. The shipsets were planned to be assembled and finished on PT. Industri Kapal Indonesia (PT. IKI) shipyard located in Makassar. Unfortunately, due to the monetary crisis on 1998, these projects were unfinished. From 31 fishing vessel only 16 were able to be finished, including Mina Jaya Niaga 11 fishing vessel.

Figure 1.1 Mina Jaya Niaga Fishing Vessel
(Source: Mina Jaya Niaga Documentation)

All of the Mina Jaya Niaga Fishing Vessel, as seen on figure 1.1, are equiped with special equipment and specialized to catch tuna fishes. There are several methods based on the fishing gear applied which used to catch tuna. The one which this vessel has is long-lining method. This method along with any other passive fishing gears such as pots and traps considered being less severe, and the amounts of fuel required per kg of catch smaller than the other active fishing gears (Suuronen, 2011).

Based on the survey conducted by PT. IKI and NASDEC team there are 5 vessels which classified worthy to be repair because the ship is still in good condition and has not undergo severe damage. Mina Jaya 11 are among ship which is still

worthy to be repair. The surveys are under supervision from the Minister of Fisheries and Maritime Affairs. The Minister intended to re-operate again the vessel because they want to save the Mina Jaya asset before all of the vessels having a lot of damage and cannot be re-operating again. The 5 vessel then will be repair and re-operate again. Meanwhile the other vessel will be scrapped. The action made to the assets will also help PT. IKI clearing the area since all of the vessels are now covering the productive area of PT. IKI.

The refurbishment and re-operation will also help the government to achieve several missions on maritime sector. One of the missions is combating illegal, unregulated, and unreported fishing. On 2014, it is estimated that around 19,443 tons of tuna exports to the US are illegal and unreported (Greenpeace, 2015). The effect may devastate for the nation as it will make Indonesia government loss a lot of income because of the illegal fishing. This condition make the government needs to strengthen the maritime sector by empowering the fisherman to have much more and better uttility to catch the fish. Moreover, the government also planned to get doubled the production of fisheries by 40-50 million ton per year on 2019.

Therefore, based on the several purpose of the project, a feasibility study is needed to examine deeper about the project. Feasibility study is conducted at the beginning of the project. It will help answering wether the project is feasible enough to carry on or finding alternative scenario to make the project reasonably feasible. Then, further policy or action can be made after finished the feasibility study. In this thesis, further action about the fate of Mina Jaya Niaga 11 fishing vessel can be decided after conducting feasibility study.

1.2 Problem Statements

Based on the problem background, the problem statements for the thesis are:

1. How much the capital expenditure needed to repair Mina Jaya Niaga 11 fishing vessel?
2. How much the operation expenditure on Mina Jaya Niaga 11 operating as fishing vessel?
3. How is the feasibility analysis of re-operation Mina Jaya Niaga 11 as fishing vessel?

1.3 Research Limitations

The limitations of this thesis are:

1. The thesis object is only Mina Jaya Niaga 11 fishing vessel.
2. The thesis is conduct by examining the capital expenditure and operation expenditure of the ship then make operating scenario to examine the feasibility analysis.
3. The equipment and machinery onboard Mina Jaya Niaga 11 is assuming only need repair and recondition. The spare part of each equipment and machinery are using the same spare part belongs to other ship which is not installed yet.
4. The thesis does not discuss about the regulatory impact analysis.

1.4 Research Objectives

The research objectives of this thesis are:

1. Acquire the capital expenditure needed to repairing Mina Jaya Niaga 11 fishing vessel.
2. Acquire the operation expenditure on Mina Jaya Niaga 11 operation as fishing vessel.
3. Analyzing the feasibility of operating Mina Jaya Niaga 11 as fishing vessel.

1.5 Research Benefits

By doing feasibility analysis from this project the benefits are:

1. The result may become suggestion regarding the fate of Mina Jaya Niaga 11 fishing vessel and saving the asset before it breakdown.
2. Giving reference to the Minister of Fisheries and Maritime Affair to make policy or action regarding the Mina Jaya Niaga project.
3. Helping PT. IKI to clear the area which is used as Mina Jaya Niaga vessels parking spot.

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CHAPTER II
LITERATURE REVIEW

2.1 Mina Jaya Niaga Fishing Vessel History

The Indonesia Minister of Finance appoint PT. PANN as the executing agency on the procurement project of Mina Jaya Niaga fising vessel. The appointment was written on Surat Menteri Keuangan No. S-493/MK.016/1994 which issued on June, 30th 1994. The vessel were bought from Spain in the form of vesselset, not a fully assembled vessel. Then, the vessel were planned to be assembled and finished on PT. Industri Kapal Indonesia (PT. IKI). This appointment was written on SLA No. 779/DP3/1994 which issued on December, 26th 1994. There were 31 vessel ready to be assembled from the vesselsets.

As time goes on, PT. IKI were able to finished only 14 vessel. It is because PT. PANN as the executing agency has some difficulties funding the whole project and PT. IKI doesn't has any capital to bails the assembling process of the vessel. Unfortunately, on 1998, Indonesia undergo a monetary crisis and this condition made the whole project were left stranded. Morover, from 14 vessel only 2 vessel were able to be chartered. It is causing PT. PANN doesn't have any income to continue the project. Then all of the Mina Jaya Niaga vessels that had been build were parked on the area of PT. IKI vesselyard and left abondened.

On 2005, the government were displacing all of the Mina Jaya Niaga fishing vessel asset from PT. PANN to PT. IKI. The displacement was written on Surat No. S-117/MBU/2005 tgl. 22 Maret 2005. The asset displacement also being approved by the Minister of State-own Enterprises and the Minister of Finance which written on Surat Dirjen Perbendaharaan No. S-3715/MK.6/2006 on June, 20th 2005. In the letter, it is said that all asset of Mina Jaya Niaga fishing vessel were displaced from PT. PANN to PT. IKI since April, 1st 2005. The letter also mention that the government will stop the loan for PT. PANN and they will started to giving loans for PT. IKI. The minutes of meeting were written on Berita Acara Serah Terima No. 04/H/HK/2005 tgl. 5 April 2005 on April, 5th 2005 and then they signed the agreements.

On 2013, the government started to discuss again the furthermore process for the rest of the project, with the consideration that the vessel may have lot of advantage if it reused again. Also, with re-operating the vessels the government intend to help PT. IKI to expand their bussines. The meeting was held on

August, 20th 2013 and October, 31st 2013. Then on 2014 and 2015, PT. Perikanan Nusantara intend to chartered 4 vessel. They chartered Mina Jaya Niaga 6 (April, 24th 2014), Mina Jaya Niaga 12 (November, 3rd 2014), Mina Jaya Niaga 10 (April 9th 2015), and Mina Jaya Niaga 11 (April, 9th 2015). On 2014, Mina Jaya Niaga 6 had been operated and on the process of getting permission to go operating, meanwhile Mina Jaya Niaga 12 was on repairing process and then it getting ready to be handover to the company who rented it.

Unfortunately, the government issued a policy on 2015. The policy was written on Surat Edaran No. B.1234/DJPT/P.I.410.D4/31/12/2015 which is stated that there is a limitation of Gross Tonnage for every vessel which allowed to commercially catch fishes on the sea. A vessel above 150 GT was not allowed to catch fishes on Indonesia sea territory, meanwhile Mina Jaya Niaga vessel has 512 GT so its not allowed to operate. Moreover, in order to issued a permit to load fishes for vessel (Surat Ijin Kapal Pengangkutan Ikan [SIKPI]) or to extend the permit, it is only can be done only for the name which stated on the gross tonnage document. On the previous period it can be done by other name different from the gross tonnage document but one must attach a letter of attorney from the original name.

This condition cause the vessel inoperable. There were two vessel which able to operate but it is for one year only. The vessel were Mina Jaya Niaga 6 & 12 and now the location of the vessel is on Ambon and Papua. For Mina Jaya Niaga 10 & 11, it still parked on PT. IKI.

2.1.1 Mina Jaya Niaga 11 Fishing Vessel

Figure 2.1 Mina Jaya Niaga 11 Fishing Vessel
(Source: Mina Jaya Niaga Documentation)

The figure 2.1 show the Mina Jaya Niaga 11. It is one of the vessel which is able to be finished by PT. IKI. The vessel type is a tuna longliner fishing vessel. The vessel original design was made by Cintranaval, S.A from Spain and then it was assembled and finished by PT. IKI in Makassar. The technical specification of the vessel are shown on the table 2.1.

Table 2.1 Mina Jaya Niaga 11 General Data

General		
Vessel Name	:	Mina Jaya Niaga 11
Year of Built	:	1999
IMO No	:	9210543
Type	:	Tuna Long Liner
Hull Material	:	Steel
Length Overall (LOA)	:	50.70 m
Length Between Perpendicular (LPP)	:	43.00 m
Breadth (B Moulded)	:	08.40 m
Height	:	03.60 m
Design Draft	:	03.20 m
Gross Tonnage	:	± 360 Ton (Oslo Regulation) ± 512 Ton (IMO Regulation)
Service Speed	:	11.00 Knot
Complement	:	25 persons
Classification	:	BKI
Class Notation	:	+ A 100 I "Fishing Vessel" + SM SMP_F "Quick Freezing"

(Source: Mina Jaya Niaga 11 Vessel Particular)

2.2 Tuna Long-Liner Fishing Vessel

There are few technic to catching tunas exist today. These technic are distinguished by the different fishing gear applied on the vessel. Among those

technic the most popular catching technic is long-lining. Long-lining is consider the most efficient way for catcing fishes, not only specific on tuna (Suuronen, 2011). In Indonesia, these fishing technic are the most popular and widely used among the fisherman.

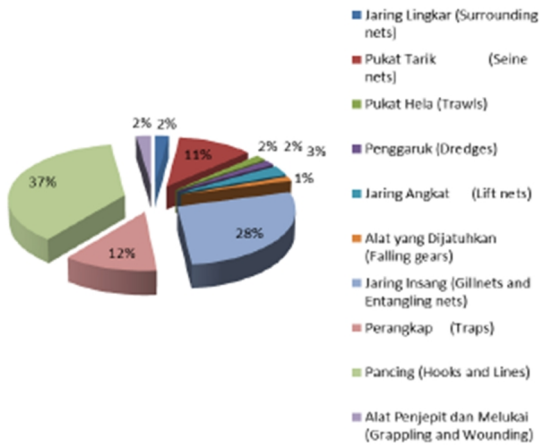

Chart 2.1 Number of Marine Inland and Openwater Fishing

Units by Group of Fishing Gear
(Source: Badan Pusat Statistik, 2014)

The piechart on figure 2.2 shows the number of fishing units by group of fishing gear in Indonesia on 2014 which is recorded by Badan Pusat Statistik (BPS). The total number of all fishing unit operated in Indonesia on 2014 are about 1.139.795 units (Badan Pusat Statistik, 2015). The long-lining method are included in hooks and line group. Among all of the fishing gear which used to catch fishes, the long-lining method are the most favourable one because it has 37% from all of the method applied in Indonesia.

2.2.1 Fishing Gear on Tuna Long-liner Fishing Vessel

The long-liner method is a passive fishing method that used a long line which is floated on the sea surface. These line, usually called as main line, are floated using a buoy which is already mesured in precise distance. Then, there are branch lines that attach on this main line and the fishing hook will take a place on this branch lines (Joseph, 2003).

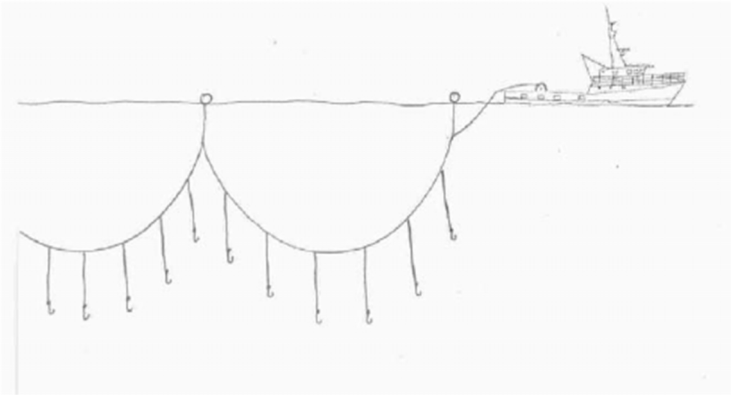

Figure 2.2 Tuna Long Liner
Source: (Swenarton, 2004)

The main line are made of monofilament which has diameter ranging from 3-4 mm. It has round-shape cross section and it transparent in color, some line has blue color because it is believe that blue color makes the fish unable to detect the fishing line. Usually the length of this main line is ranging from 250-800 m (FAO, 2003).

On the main line there are many line so called branch line as it can be seen in figure 2.2 hanging to catch fishes. The branch line also made from monofilament and has diameter of 2 mm. This line usually has length for about 10-50 m dangling from the main line. The space between one branch line and other branch line usually ranging from 60-100 m on the main line. The fisherman can adjust the depth of the branch line by modified the interval of the main line between the floating buoy. This is important because there is specific depth to catching tuna and the depth of the branch line should be adjusted on the depth to maximize the catching ratio of the fishes (FAO, 2003).

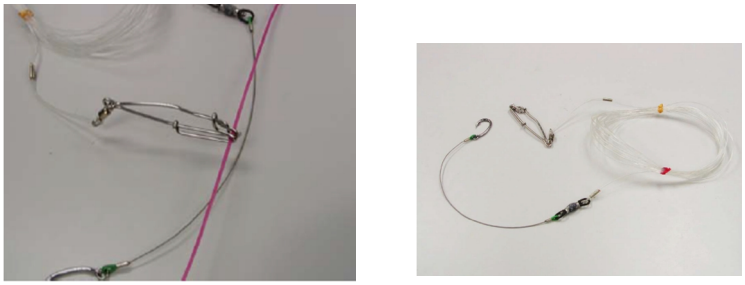

Figure 2.3 Main Line and Branch Line
Source: FAO, 2013

The figure 2.3 are the main line (left) and branch line (right). The branch lines are attached to the main line using snap, ring, and sleeves. The connection between main line and branch lines should be connect together without a knot because the strenght of the main line will be reduce if connected by knot. Then the hook will be attach on the end of the branch line (FAO, 2003).

2.2.2 Working Method of Tuna Long-Liner Fishing Vessel

Long-liner method originated from Japan. Now, this method are widely used in the world. One of the advantage is the fisherman may catch tunas by the depth of 300 meter from the sea surface. One set of a line consist of 200 unit of so called the basket. Basket is a section of line between two floating buoy. The working method of tuna long-liner fishing vessel will be describe.

1. Baiting Long Line

Figure 2.4 Baiting Long Line Process
Source: Greenpeace, 2013

Figure 2.4 shows the first step in operating long lining fishing gear. On this first step the crews are preparing the bait by hooking the bait to the hook. This process can be done either manually or by machine. When manually handled done by the crew, one person will incharge to hooking the bait to the hook. Then the other crew will attach the branch line which already hooked with he bait unto the main line (FAO, 2003).
The bait are categorized into two category. The first category are passive bait such as Lemuru Fish, Layang Fish, and squids. The other are active bait such as Bandeng Fish (Adyas, Zainudin, & Yusuf, 2011).

2. Setting Long Lines

Figure 2.5 Setting Long Line Process
Source: Greenpeace, 2013

The second process are done after baiting long line process are finish. The rolled main line then deployed to the sea thorugh a machinery which is located on the aft of the vessel. During the deployment, see figure 2.5, the main line to the sea, the branch line are attached to the main line. The vessel operated about 9.5 – 11.5 knot during this process (FAO, 2003).

The depth of the hook are set by varying the distance between the floating buoys and changing the velocity of the main line feeder and also the velocity of the vessel. This arrangement are controlled from the whell house. There is one buoy which operate as radio buoy. This buoy will indicate the location of the line when the vessel back for hauling the long line. It takes 5-6 hour to do the whole process. After the last buoy

which is the radio buoy are deployed the crew take a rest while waiting the catch for about 4 hour (FAO, 2003)

3. Hauling Long Lines

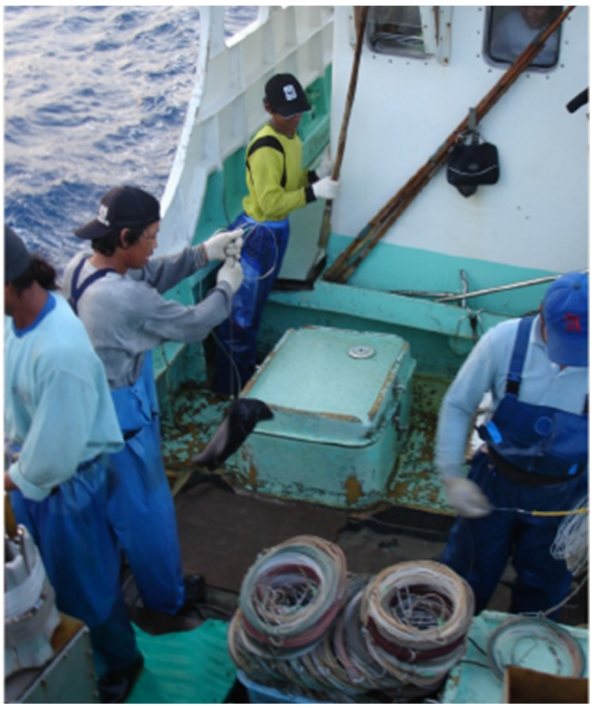

Figure 2.6 Hauling Long Lines
(Source: Panduan Pengoperasian Tuna Longline Ramah Lingkungan, 2011)

The next process is hauling long lines. This process begin with finding the radio buoy. After the radio buoy are found, the line are pulled with line hauler machinery and the line will start to be rolled. The velocity of the hauling lines are controlled by the crew because while pulling the line the crew need to release every crumpled knot and release the branch line from the main line, shown in figure 2.6. Then the branch line are tidy up and placed on the railing (FAO, 2003).

4. Landing Catch

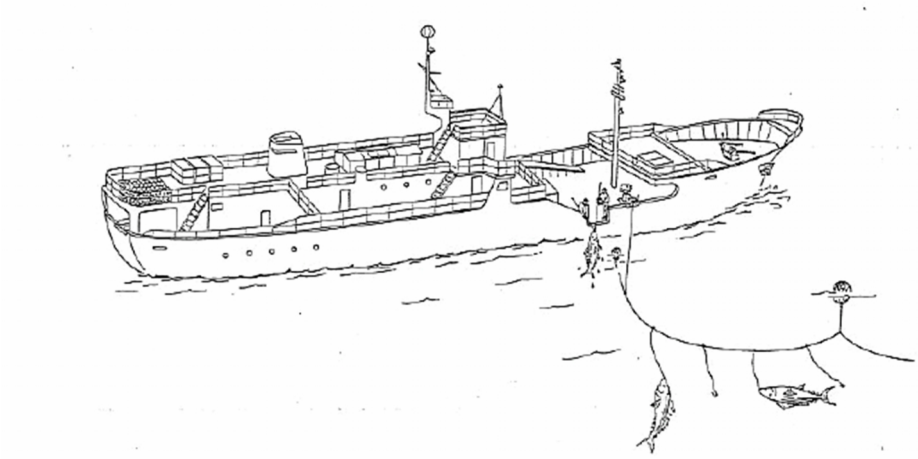

Figure 2.7 Hauling and Landing Catches
Source: FAO, 2013

When there is fish caught by the hook during the hauling process, see figure 2.7, the vessel will slow down and follow the direction of the fish. When the fish are already in the side of the vessel the crew will catch the fish with a spear or harpoon. Then the branch line will be cut but the crew let the hook still attach on the mouth of the fish to make it easier when the crew handling and putting the fish on the freezer (FAO, 2003).

5. Fish Handling On Board

Figure 2.8 Fish Handling On Board
(Source: Panduan Pengoperasian Tuna Longline Ramah Lingkungan, 2011)

The on-board fish are to be killed so that it may harmless for the crew because jumping fish will dengerous for the crew as it cannot be controlled. This method also keep the quality of the fish. As seen on figure 2.8, the caudal fin, gill, and the guts of tunas are removed before placing tuna on the freezing room (Adyas, Zainudin, & Yusuf, 2011).

2.3 Vessel Repairing

Mina Jaya Niaga 11 has been parked at about 10 years in the PT. IKI Vesselyard area. Therefore several major repair should be done in order to re-activate the vessel. According to the classification, the vessel should undergo a renewal class survey since the classification class already worn out. It also must conform with several regulation about seaworthiness aspect so that the vessel may obtain the permit to catch fishes.

2.3.1 Seaworthiness Aspect

According to the Peraturan Menteri Perhubungan Laut KM 01 tahun 2010 about Surat Persetujuan Berlayar, seaworthiness is vessel which meet the safety regulation about safety issues, prevention about pollution from the vessel, manning, load line, loading, the welfare of the vessel's crew and healthy of the passenger, vessel's law status, vessel's safety management and prevention from the vessel pollution, and vessel's safety management for sailing on certain route. The vessel must comply with the technical and administration aspect to obtain port clearance (SPB).

To fishing vessel, port clearance often called with warrant of operation (SLO). The regulation about SLO for fishing vessel are regulated on Peraturan Menteri Kelautan dan Perikanan Republik Indonesia No. Per. 07/MEN/2010 tentang Surat Laik Operasi Kapal Perikanan. The letter stated that to obtain SLO, a vessel must comply every technical and administration aspect. In other word, to consider to be seaworthiness, a vessel must obtain the letter.

Furthermore, the regulation about technical regulation of seaworthiness can be found in Peraturan Direktur Jenderal Perhubungan Laut No. HK/103/2/19/DJPL-16. The regulation stated that in order to be seaworthiness in term of technical aspect a vessel must provide the requirement, such as:

1. Ratification of vessel design blue print
2. Monitoring during a new build vessel and vessel repairing
3. Examination and calculation of load line
4. Ratifiaction of load line
5. Measurement, registration, and ratification of certificate of vessel's nationally
6. Ratification of sea letter or pas besar
7. Certification of vessel safety aspect from the vessel safety authority
8. Certification of pollution prevention from vessel
9. Certification of vessel safety management
10. Certifiaction of vessel manning

The technical aspect from Direktur Jenderal Perhubungan Laut No. HK/103/2/19/DJPL-16 stated that a vessel must be certificated by vessel safety authority. This authority will issued a certificate that indicate the vessel already following all the regulation to considered as safety vessel. This vessel safety authority usually called surveyor from the classification society. Previously, Mina Jaya Niaga 11 fishing vessel already registered with Biro Klasifikasi Indonesia (BKI) class. But the class period only valid for 5 year. Since Mina Jaya Niaga 11 already exceed 5 year period of class the class status of this vessel is withdrawn. To obtain safety certificate from the class the vessel need through a renewal class survey which is already regulated from BKI. The regulation stated in BKI volume 1, section 3. The chapter contain the items and what need to be inspect to get a class status.

2.4 Regulation Related to Tuna Long-Liner

For fishing vessel there's also regulation which regulate the fishing gear since not all type of the fishing gear allowed to operate in Indonesia because some fishing gear considered dangerous and destroying the environment on the ocean. Mina Jaya Niaga 11 fishing vessel use longlining as it fishing gear. The regulation of this fishing gear regulated on Peraturan Menteri Kelautan dan Perikanan Republik Indonesia No. 42/PERMEN-KP/2014 tentang Perubahan Keempat atas Peraturan Menteri Kelautan dan Perikanan Nomor PER.02/MEN/2011 Tentang Jalur Penangkapan Ikan dan Penempatan Alat Penangkapan Ikan dan Alat Bantu Penangkapan Ikan di Wilayah Pengelolaan

Perikanan Negara Republik Indonesia. On this regulation, the long-lining fishing gear must comply some requirements.

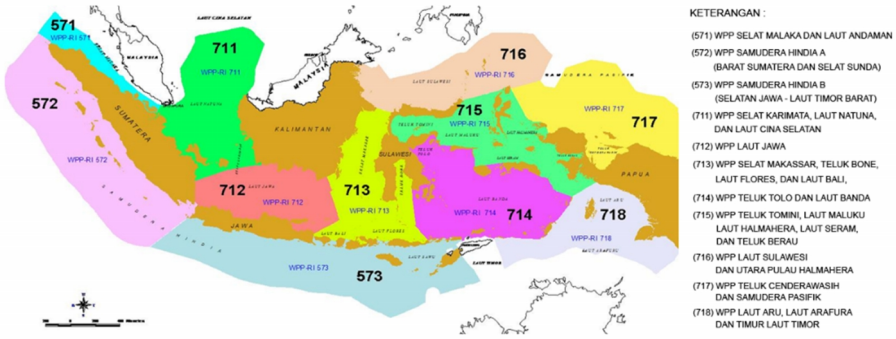

Figure 2.9 Indonesia Tuna Long-ling Fishing Ground
Source: (http://enr.bappenas.go.id)

1. The hook must be less than 2500 hooks and the maximum number of the line is 4.
2. The vessel should be not to be less than 30 GT.
3. The area of catching fish must be in area III (12 mile from the beachhead).
4. The area which allowed in order to operate are WPP 571, 572, 573, 711, 712, 713, 714, 715, 716, 717 dan 718 (See figure 2.4).

There are new regulation which may effect the operation pattern of the vessel. The regulation stated in Peraturan Menteri Kelautan dan Perikanan No. 57 tahun 2014 does not allowed any transhipment from vessel to vessel in the middle of the ocean. The tuna long-liner vessel act as the catching vessel and there will be another vessel come in a period of time to bring the fish to on-shore. Since it can't be done because of the regulation, the long-liner vessel must be back to the port to drop their load and then report the catch to the port authority.

A special regulation are issued by the minister to protect the tuna from over catch in FMA 714 region. WPP 714, as seen on figure 2.10, consider to be the breeding zone for the tuna, especially Yellow-Fin Tuna (*Thunus Albacores*). The regulation are written in Peraturan Menteri Kelautan dan Perikanan Republik Indonesia Nomor 4/PERMEN-KP/2015 Tentang Larangan Penangkapan Ikan di Wilayah Pengelolaan Perikanan Negara Republik Indonesia 714.

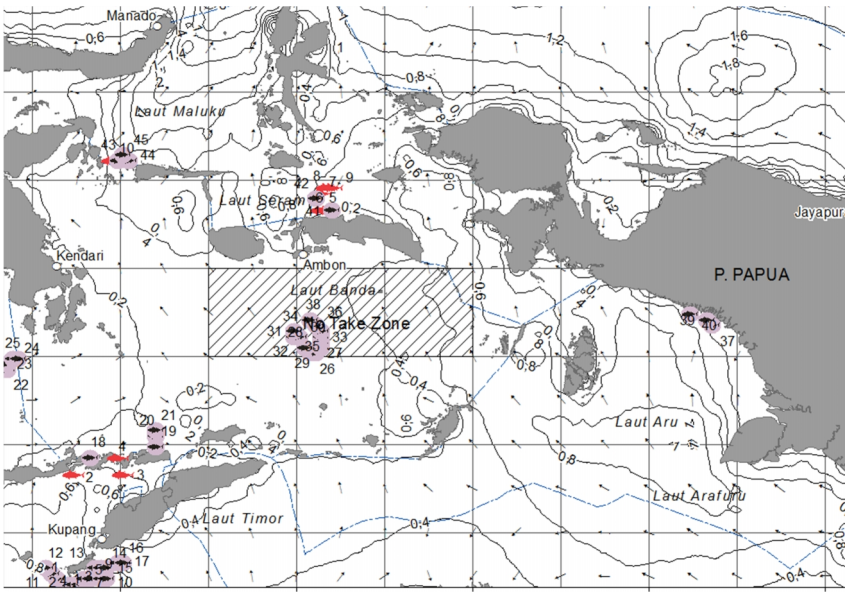

Figure 2.10 WPP 714 No Take Zone Area
(Source: Peta Prakiraan Daerah Penangkapan Ikan
Wilayah Maluku Papua)

Moreover, the Minister of Ocean and Fisheries issued Surat Edaran No. B.1234/DJPT/P.I.410.04/31/12/2015 which stated that a vessel above 150 GT are not allowed to operate to catching fishes. Due to its GT, Mina Jaya Niaga 11 fishing vessel are regulatory unable to operate. However, the Minister has a plan to re-operate this vessel so they will make an exception regulation for this vessel.

2.5 Tuna Fisheries in Indonesia

Indonesia has geographic advantage of becoming an archipelago country. This nation consist of 17,500 island separate by a large body of water with the fourth longest coastline in the world at 81,000 km (Stobuzki, 2014). One of advantage of having a large body of water is having varied marine biodiversity. According to the CEA, the population of tuna in Indonesia contribute to 16% of the total tuna reserve in the world (California Environmental Associates, 2016).

Table 2.2 Indonesia Tuna Fisheries

Group of Fish	**Potential of Fish Stock**			**Total Allowable Catch (TAC)**		
	Territory Water	EEZ	Total	Territory Water	EEZ	Total
Tuna (big-eye, albacore, bluefin)	223.7	118.7	342.4	179.0	95.0	274.0
Skipjack	392.5	154.7	547.2	314.0	123.0	437.0
Tongkol	235.1	59.5	294.6	188.1	47.6	235.7
Total	851.3	332.9	1,184.20	681.1	265.6	946.7

Source: (Sunoko, 2013)

Table 2.2 were written based on the the decree which is issued by the Minister of Ocean and Fisheries No.KEP.45/MEN/2011 about the estimation of the fisheries resource in Indonesia, the potency of fish biomass in Indonesia are about 1,145.4 thousand tonnes/year. Meanwhile the Minister of farming, are issued a decree that divided the potency of tuna fisheries in Indonesia into two group. The first one located in territory zone and the other in exclusive economy zone (ZEE). This decree written in Kementrian Pertanian No.995/KPTS/IK.210/9/99. In the territory zone it is estimated about 851.3 tonnes/year meanwhile on the exclusive economy zone it is about 332.9 tonnes/year. Moreover, it is stated on the decree that there is a Total Allowable Catch (TAC). The TAC for Big-eye, Yellowfin, Albacore, and Bluefin are about 681.1 tonnes/year while on the ZEE are about 265.6 tonnes/year.

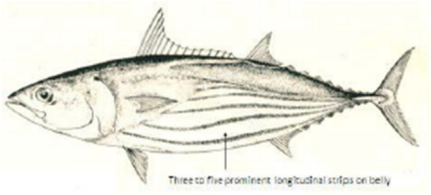

Figure 2.11 Skipjack Tuna (Cakalang)
Source: (California Environmental Associates, 2016)

From time to time the tuna fisheries in Indonesia has already exploited due to the high demand of tuna in the world. Most species have been fully exploited or over-exploited. Southern Bluefin Tuna and bigeye tuna are classified as over-exploited but there still plenty of them in Makkasar Strait waters, Bone Bay, Flores Sea, and Bali Sea. The yellowfin tuna has been fully exploited except in the Makkasar Strait waters, Bone Bay, Flores Sea, Bali Sea, Aru Sea, Arafura Sea, and Eastern Timor Sea. While the skipkjack, see figure 2.8, maintained a moderate level (Sunoko, 2013). This is indicate that there still areas which a tuna fishing sector has not developed yet and there is chance to maximize these fishing benefit.

2.5.1 Tuna Catching Data

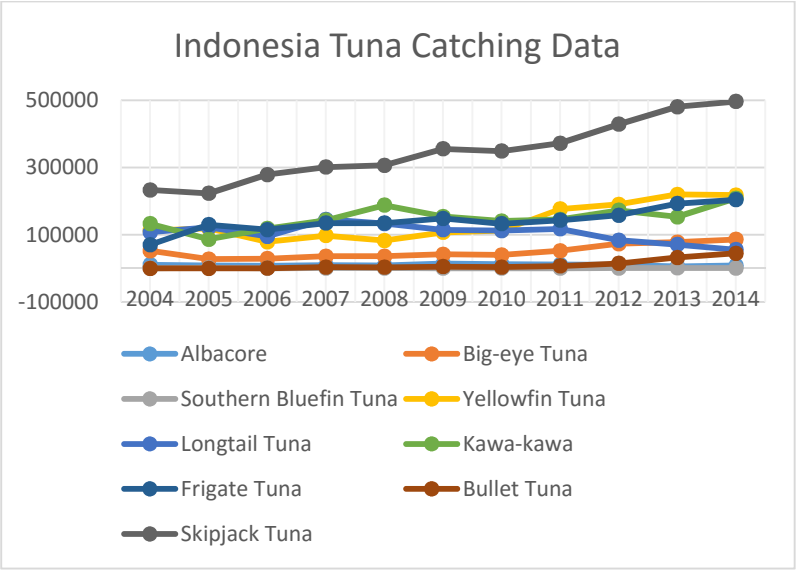

Figure 2.12 Indonesia Tuna Catching Data
Source: (Badan Pusat Statistik, 2015)

According the data collected by Badan Pusat Statistik (BPS) on 2015, figure 2.12, the tuna species which can be found in Indonesia territory are Albacore (Albakora), Big-eye Tuna (Tuna Mata Besar), Southern Bluefin Tuna (Tuna Sirip Biru Selatan), Yellowfin Tuna (Madidihang), Longtail Tuna (Tongkol Abu-abu), Kawa-kawa/Frigate Tuna (Tongkol Komo/Tongkol Krai), Bullet Tuna (Lisong), dan Skipjack Tuna (Cakalang). The most favourable tuna catches in Indonesia is Skipjack Tuna (Ikan Cakalang).

From the graph, the catching rate of tuna fisheries are increasing each year, especially for Skipjack Tuna. The other species are also increase but the increasing is not significant and consider to be stable year by year.

2.7 Fish Production Estimation

Fish production estimation is needed to foresee the revenue which can be obtain in one operation region. Productivity is the ability to produce something. Productivity of fishing vessels according to the Ministerial Decree of Marine and Fisheries No. 38 year 2003 is the level of fishing vessel ability to obtain captures per year. The productivity ratio usually called Catch per Unit Effort (CPUE). CPUE are used as indices of abundances where fishery-independent methods of counting animals are impractical (Ward, 2007). Production per trip (Catch per Unit Effort) of long liner vessel is expressed with the number of kilogram per hook of longlining. It is based on the volume of fish caught and the number of trips Tuna Longliner vessel. The formula is

$$C \quad hp \quad U \quad E \qquad (C \qquad) = \frac{F \quad h\,C \qquad\qquad V(\qquad (t(\quad)}{T \qquad T}$$

2.6 Feasibility Study

Feasibility study is a series of study which will help to make decision about a project. It is an analysis of the viability of an idea (Hofstrand & Holz-Clause, 2009). The feasibility study will study in-depth about specific business scenario and then may make a conclusion about the specific scenario in the business. It will help the project leader decided wether the project must be continue or not using the information from it (Hofstrand & Holz-Clause, 2009).

There are benefits by applying feasibility before initiate a project. The benefits are:

1. Give a direction to the project and narrow alternatives which may exist.
2. Provide new chances and may identified the reason to not to proceed the project, if any.
3. It may suspect any factors which may affect the project and make a mitigations about it, therefore the project probability of success will increase.
4. Securing funding and may attract equity investment.

5. If properly conducted, may save money before the project are start.

The stages to conduct feasibility study in general are:

1. Preparation Stage

   On this stage, a careful planning of the whole project are done. Based on the purpose of the project it is decided wether its need to conduct a feasibility study on a propose business idea or not.

2. Research Stage

   The data for the project are taken on this stage.

3. Data Arranging Stage

   After all the data needed to conduct feasibility study, the data are categorized unto two section, primary data and secondary data. The data which already gather then tabulated and arrange according to the purpose of the project.

4. Data Processing Stage

   After carefuly arranged, the data are process and analyze then compile into a feasibility report. One of the indicator which indicate the research and the feasibility study will success is the quality of the feasibility study report.

5. Project Evaluation Stage

   The data which already process then compared to the requirement which indicate wether the project are feasible or not. The evaluation is in the form of technical calculation which compare the analyze data and the requirements.

2.6.1 Capital Expenditure

The Capital expenditure are the cost needed to make an asset operable. On this thesis, the capital expenditure are all of the cost needed to repair Mina Jaya Niaga 11 fishing vessel and the cost which is must be paid to the shipyard. The other capital expenditure is how much the ship value to determine the price of the vessel.

2.6.2 Operation Expenditure

The operation expenditure are the cost when operating the asset. The major direct vessel expenditure for fishing vessel are ship fueling, crew shore leave expenditure, ship provisioning, air freight forwading and ground services, fish handling, cold storage and reefer operation, port and other infrastructure fees, and salt/ice purchases. (Hamnett & Sam, 2000).

The most expensive cost in operation expenditure is fuel cost. It is estimated about 50% of the operation expenditure total cost is the fuel cost (Gulbrandsen, 2012). For Mina Jaya Niaga 11 the fuel cost should be higher because it's not only main engine which is need fuel but the auxiliary need fuel to driven the cold storage on the vessel.

2.6.3 Net Present Value (NPV)

Net present value is an assesment the nett revenue from a company after it reduced by other cost so that the increasing and decreasing of the capital of the company can be analyze. NPV may give clear view wether a project investment are feasible or not.

In other words, the assessment for the Net Present Value (NPV) is the netto of cash flow so it can be interpreted as financial analysis which used to determine the appropriateness of the work done by the company. It may seen through the present value of net cash flows which received by companies compared with the current value of the investment capital issued by the company (Bank Indonesia, 2014).

The formula of NPV is

$$N = \sum_{t=1}^{n} \frac{B - C}{(1+i)^t}$$

where,

Bt = Benefit which obtain on t-year
Ct = Cost which issued on t-year
i = Discount rate
n = Investmen period

- If the NPV > 0, the investment indicate having positive effect to the company, so the project are feasible enough to be done.
- If the NPV < 0, the investment indicate causing breakdown for the company, so the project are considered as not feasible.
- If the NPV = 0, the invesment will not cause the company gain profit or loss profit. If the project are executed it will not have any effect for the company financial.

2.6.4 Internal Rate of Return (IRR)

Internal Rate of Return is an investment calculation method used to calculate the interest rate that equates the present value of the investment with the present value of net cash flow in the future (Bank Indonesia, 2014).

The formula of IRR is

$$\text{IRR} = i_1 + \left[\frac{N_1}{N_1 - N_2}\right](i_2 - i_1)$$

where,

NPV_1 = Positive NPV
NPV_2 = Negative NPV
i_1 = discount rate on positive NPV
i_2 = discount rate on negative NPV

IRR may indicate wether the project is feasible or not. If IRR is greater than the discount rate specified then an investment can be considered feasible. And vice versa, if the IRR is less than the discount rate which already specified, the business is not eligible to be done.

2.6.5 Payback Period

The payback period use to define project's time needed to overcome the total investment cost. If the payback period values are shorter than the project period the project is considered to be feasible. If it exceed the project total time than the project is not feasible (Bank Indonesia, 2014). The formula is :

$$P \qquad P \qquad = \frac{i}{\pi} \; x \; 1 \; yea$$

where,

I = Investment
π = Profit per year

2.6.7 Net B/C Ratio

Net Benefit Cost Ratio is a comparison between benefit value and cost value. A benefit cost ratio is the ratio of the benefits of a project or proposal, expressed in monetary terms, relative to its costs, also expressed in monetary terms. All benefits and costs should be expressed in discounted present values. Benefit cost ratio (Net B/C) takes into account the amount of monetary gain realized by performing a project versus the amount it costs to execute the project. The higher the BCR the better the investment. General rule of thumb is that if the benefit is higher than the cost the project is a good investment (Bank Indonesia, 2014). The formula is :

$$\text{Net B/C} = \frac{N \quad b \quad p}{N \quad b \quad n}$$

Where,

Net B/C	= Benefit-cost ratio value
NPV bc positive	= Positive Net Present Value
NPV bc negative	= Negatice Net Present Value

Net B/C ratio value consists of two important things, there are :
1) Net B/C ratio ≥ 1 means the project is feasible
2) Net B/C ratio ≤ 1 means the project is not feasible

2.6.8 Break Even Poin (BEP)

Break Even Point is a condition where production or income level is equal as the outcome of the project. Therefore, on that condition the project is not obtaining any profit and loss (Bank Indonesia, 2014). The formula which based on the unit sales revenue is:

$$\text{BEP (Rp)} = \left[\frac{F \quad C}{1 - \frac{T \quad V \quad C}{S \quad R}} \right]$$

The other BEP is obtain by unit. It shows how many unit are sold to obtain the BEP of the project. The formula is:

$$\text{BEP (Units)} = \left[\frac{B \quad (R\ )}{S \quad n \quad P \quad U}\right]$$

If variable cost and fixed cost are not separated, then to find the break even point could use the principle of total income = total outcome
Total Income = Price x Production quantity
Total Outcome = Summary of all cost needed during project (Sales price unit x Production quantity)

$$\text{BEP (n)} = \left[\frac{B \quad (R\ )}{S \quad R \quad (R\ )}\right] x\, T \qquad P \qquad Q$$

2.6.9 Discount Factor

The value of money its different from time to time therefore, discount Factor is defined as : "Factors which used for calculating present value from the multiply of future income by considering applied interest rate or also called present worth factors". DF is counted for multi-period project. Commonly, the period is calculated by semester or year (Bank Indonesia, 2014). The formula for calculating DF is:

$$D \quad p \quad y \quad = \frac{1}{(1+r)^n}$$

Where,
r = Interest rate
n = year 0, 1 … n; according to project period

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CHAPTER III
METHODOLOGY

3.1 Methodology Flow Chart

Figure 3.1. shows a flowchart diagram of methodology of the thesis. It describe the working process of this thesis from literature review, data collecting process, data processing, feasibility analysis of Mina Jaya Niaga 11 re-operatin, also conclusion and recommendation for further work.

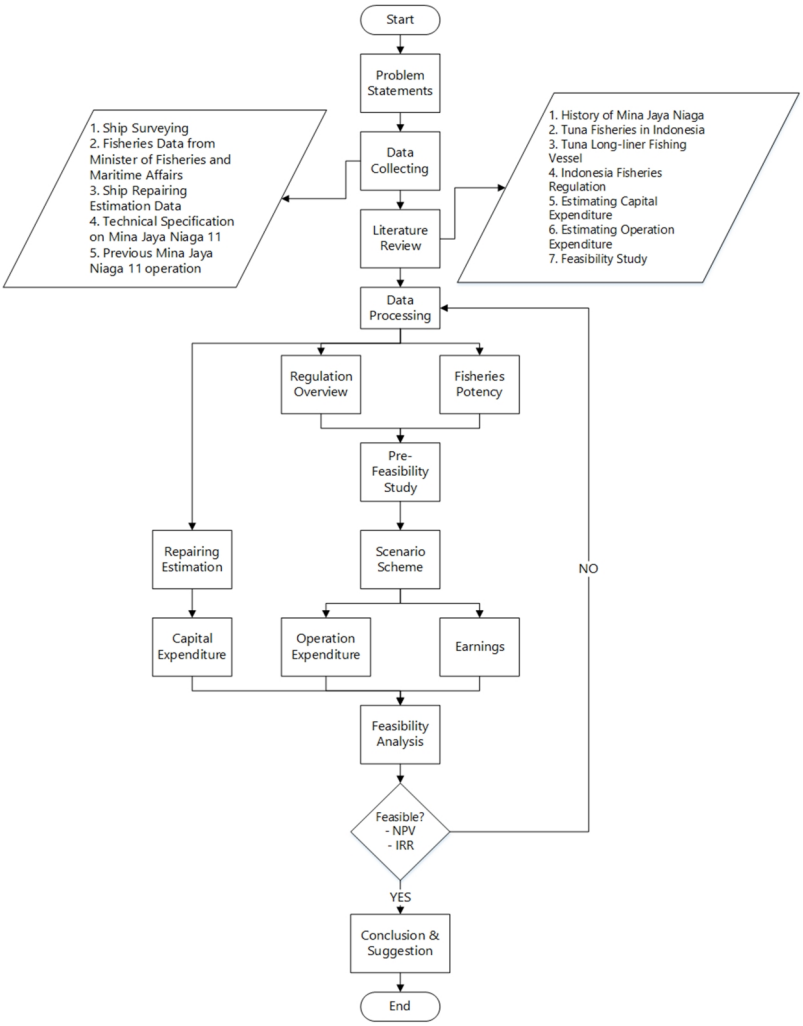

Figure 3.1 Methodology Flowchart

3.2 Definition of Methodology Flowchart

1. Problem Statements

Problem statements are the process which stated the limit the discussion of this thesis. Therefore all of the problem may objectively answered. This process are important because it define the problem and define wether the problem are worthy enough to solve as thesis or not. The problem formulation are formulated from the history of the problem and the future posibilities which may occur because of it. From it, the purpose of the thesis is also knowable.

2. Data Collecting

The data collecting process needed as the basis of the information which then to be analyze on this thesis. The data are categorized into two category. The first data is primary data which is the survey activity and report on Mina Jaya Niaga 11 Fishing Vessel. The secondary data are Mina Jaya Niaga 11 technical specification, including GA, Lines Plan, and engine specification, annualy fisheries data from Ministes of Fisheries and Maritime Affairs, vessel repairing estimation data, and previous operation report from Mina Jaya Niaga vessel.

3. Literature Review

After listing the problem statements, literature review are conducted to find additional information regarding to the problem. Morover the additional information will be supproting arguments regarding the problem. There literature which are taken as reference come from journal, thesis work, article, reports, and any information which is about history of Mina Jaya Niaga project, tuna fisheries in Indonesia, tuna long liner fishing vessel, Indonesia fisheries regulation, estimating capital and operation expenditure, and feasibility study.

4. Data Processing

At this stage the data will be observed and analyzed, there are:

- Pre-feasibility study by examining the fisheries regulation and fisheries potency in Indonesia.

- After the pre-feasibility study done, then comes to make an operation scenario scheme of Mina Jaya Niaga 11 as tuna long-liner fishing vessel.
- After deciding the operation scheme, the operation expenditure and earnings per year can be calculated.
- In paralel, the vessel will be estimated to know how much the capital expenditure needed to re-operate the vessel.

5. Feasibility Analysis

After all of the data are processed then comes to feasibility analysis. On this stage the capital expenditure, operation expenditure, and earning based on the scenario will be analyze to let know the Net Present Value (NPV) and Internal Rate of Return (IRR) of the project based on the scenario which already determined before.

Then comes to the yes or not question wether the project is feasible or not. If its already feasible, then it will proceed to the conclusion and suggestion. If not, the capital, operation, and earnings will be adjusted to find the project feasible.

6. Finish

At the last stage, the conclusion of the whole thesis are stated and it is make sure that the conclusion will answer the objective of the thesis. There are also suggestion given based on the analysis of the thesis to become the basic of other research either directly related to this research, the data, or the methodology used on this thesis.

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CHAPTER IV
DATA ANALYSIS

4.1 Pre-feasibility Study

Pre-feasibility study is conducted to examine other relevant factor so that it may help to sort out relevant scenario. The pre-feasibility study may tell earlier wether the project is worthy enough to carry on or not. It will save a lot of time of money if the finding during pre-feasibility study is found not worty enough to be continuing rather than already working the entire progress.

In this thesis, the pre-feasibility study is conducted by examining the regulation which regulates the fishing activity in Indonesia and tuna fisheries potency in Indonesia. Through this, the activities of repairing can be continue without any doubt that the project is not worthy enough to be done.

4.1.1 Regulation Overview

Indonesia is a vast country with a majority of sea rather than the land. This condition make a very large of fishing activity are conducted in Indonesia. By this factor, the government wants to establish a maritime sovereignity to protect the sea.

These are the the regulation which effect the fishing activity, especially for tuna long-liner since Mina Jaya Niaga 11 use this kind of fishing gear.

1. Peraturan Menteri Kelautan dan Perikanan Republik Indonesia Nomor 42/Permen-KP/2014 tentang Perubahan Keempat atas Peraturan Menteri Kelautan dan Perikanan Nomor Per. 02/MEN/2011 tentang Jalur Penangkapan Ikan dan Penempatan Alat Penangkapan Ikan dan Alat Bantu Penangkapan Ikan di Wilayah Pengelolaan Perikanan Negara Republik Indonesia.

This regulation regulate the fishing gear which is permitted to be operate in Indonesia, since not all of the fishing gear are legal in this country. Some fishing gear like trawls is forbidden to be operating in all Fisheries Area Management (Wilayah Pengelolaan Perikanan). From this regulation, a long-liner must conform:

The hook must be less than 2500 hooks and the maximum number of the line is 4. The vessel should be not to be less than 30 GT. The area of catching fish must be in area III (12 mile from the beachhead). The area which allowed in order to operate are WPP 571, 572, 573, 711, 712, 713, 714, 715, 716, 717 dan 718 (See figure 2.4).

2. Peraturan Menteri Kelautan dan Perikanan No. 57 tahun 2014

Previously, a long liner operation requires two vessels. A vessel used to catch the fish and the transport vessel to carry the fish to the port. The operation scheme is the long-liner will catch the fish and then transfer its catch to the transport vessel so that it will bring the catch to the port.

On this regulation, the Minister of Fisheries and Maritime Affairs wants to forbidden any transshipment because it is lead to the illegal sale to another country. So, it will affect the Mina Jaya Niaga 11 operation scheme as it must go back to port to land its catch.

3. Peraturan Menteri Kelautan dan Perikanan Republik Indonesia Nomor 4/PERMEN-KP/2015

This regulation forbids any fishing activity in the breeding zone of yellow fin tuna in WPP-714. See, figure 2.10. It will affect the Mina Jaya Niaga 11 operation scheme as it must look for another fishing ground.

4.1.2 Fisheries Potency

Table 4.1 MSY of Each FMA (thousand ton/year)

	FMA-713	FMA-714	FMA-715	FMA-716	FMA-717	FMA-718
MSY	929.7	278	595.6	333.6	299.1	855.5
Product	625.8	427.6	418.5	214.3	142.8	537.9

(Source: Minister of Fisheries and Maritime Affairs, 2010)

The table 4.1 shows the fisheries potency in the 6 FMA (WPP) which is near with Makkassar since the vessel located on Makassar. The FMA's also locating in East Indonesia region because it's still lot of fishing potency which is not been caught yet.

The table shows the MSY of each WPP. MSY or Maximum Sustainability Yield is the upper limit of catch which will prevent it from overcatch. Any catch above the MSY will result a decreasing of tuna by year to prevent it, the government make a limit about it. The FMA-714 indicates that there is an overcatch fishing activity on there so the government made the regulation to restore the fisheries on there.

4.2 Mina Jaya Niaga 11 Operation Scenario

The fishing scenario are important, as it will become to predict the maximum earning which caused by the whole operation. The scenario will also help to determine the assumption and parameter for continous analysis. On this project, FMA-715, with Bitung as home port is choosen as it has the most fishes to another FMA. Operation in FMA-715 will also conform to the regulation which stated that there are some region of FMA-714 which forbidden to any fishing activity.

4.2.1 FMA-715

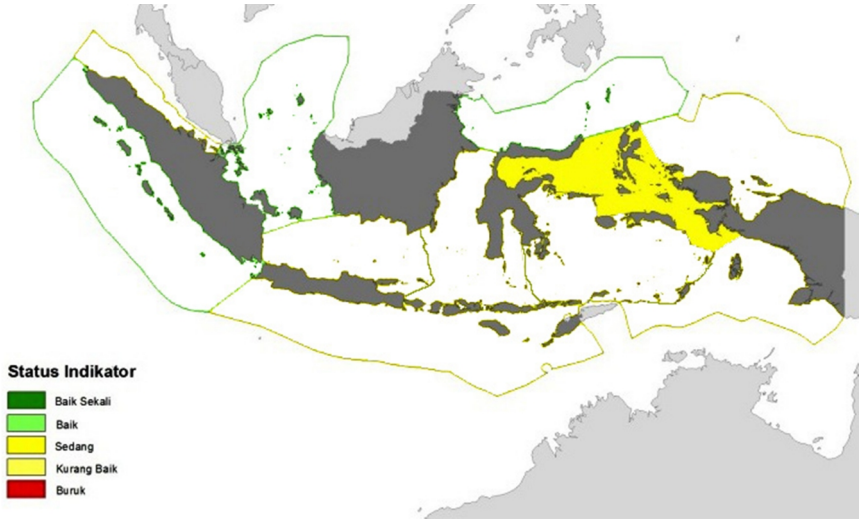

Figure 4.1 FMA-715
(Source: http://www.eafm-indonesia.net/data/status/715)

Indonesia fishing activity where divided into several Fisheries Management Area (FMA). One of the FMA is FMA-715 (see figure 4.1). FMA-715 is covering Tomini Bay, Maluku Sea, Halmahera Sea, Seram Sea and Berau Bay. The status of FMA-715 is considered at medium level

according to the Ecosystem Approach to Fisheries Management (EAFM) indicator. EAFM is a working group of fisheries management under the Minister of Fisheries and Maritime Affairs. The indicators are region habitat, fishing resource, fishing techniques, economic aspect, and social aspect. These indicators made this region are suitable enough for a fishing activity.

Tunas are belongs to the group of big pelagic fish groups. The amounts of catch of big pelagic fish of FMA-715 are also the main aspect which made the FMA-715 is choosen. As it can be seen on chart 4.1, the chart is showing the total catch of big pelagic fish in 2014 on all of the FMA in Indonesia. The regions which produce the most of big pelagic fish are FMA-573, FMA-712, and FMA-715. The FMA-715 are slightly above the other two regions, therefore FMA-715 are to be choosen as the operating area of fishing activity.

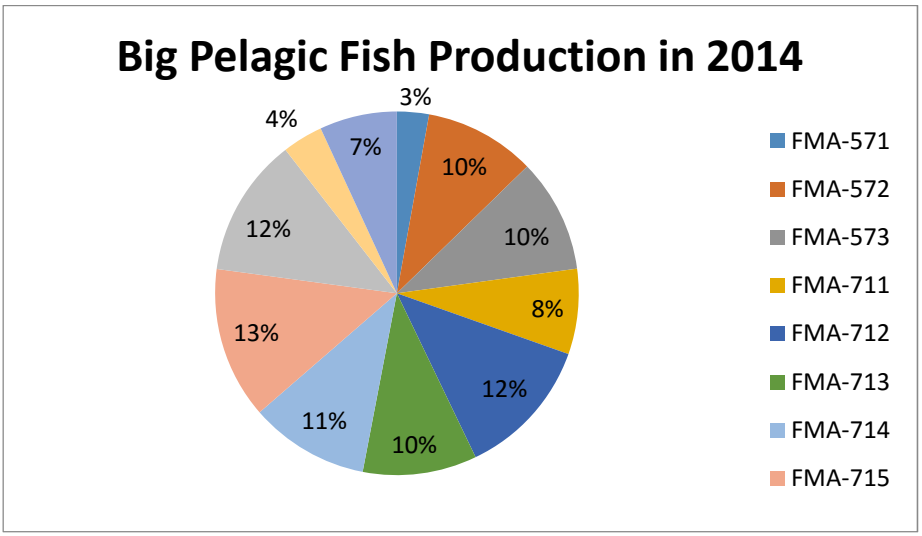

Chart 4.1 Big Pelagic Fish Production in 2014
(Source: Buku Final WPP 2014, DKP)

4.2.2 Bitung

For the operating scenario, a home port is also determined. On this fishing operation, Bitung are chosen to be the home port of Mina Jaya Niaga 11 fishing operation. Shows by figure 4.2, Bitung are located in the north of North Sulawesi region.

Bitung city are one of the fishing production center in Indonesia. (Witomo & Wardono, 2012). It has strategic location in between FMA-715 and FMA-716. This city has a Port of Ocean Fishery which established by the government based on Peraturan Menteri KP No. PER.19/MEN/2008 pada tanggal 6 Oktober 2008 tentang Perubahan atas Peraturan Menteri Kelautan dan Perikanan No Per 06/MEN/2007 tentang Organisasi dan Tata Kerja Pelabuhan Perikanan.

Figure 4.2 Bitung Location
(Source: Buku Final WPP 2014, DKP)

The facilities and the infrastructure of Bitung are choosen because it is suitable enough to accommodate large fishing vessel like Mina Jaya Niaga 11. The port has a size of 126 m x 14 m and can accommodate a fishing vessel with range of 30-600 ton. The draught of the pier is also deep enough in order to make the ship can land its catches. The water surround the Bitung Port is relatively calm as it covered by Lembeh Island. There are also shipyards which can accommodate a repairing activity of the fishing vessel (Zulham, 2011). The list of infrastructure can be seen on attachment.

Figure 4.3 PPS Bitung
(Source: https://perjalananady.com/2015/10/25/pelabuhan-perikanan-samudera-bitung/)

There is also several fishing industry which grown in Bitung. There are more than 20 fishing commercial processing industry with the main business is in export business. There are also several cannery fishing company and frozen fish company in Bitung (Zulham, 2011).

Tuna and Skipjack Tuna are the main commodity from this fisheries port. The fishing vessels which operated in Bitung are mainly longiners, purse seiners, and hand liners with ranged less than 5 GT until more than 30 GT (Witomo & Wardono, 2012).

4.2.3 Long-Liner Operation Scenario

The fishing seasons for catching tuna are varied. According to the previous operation, the peak season for catching tuna and the fishing ground for one year are shown on the table 4.2.

Table 4.2 Tuna-Fishing Season

Month	Condition	Fishing Ground
Januari	Low Season	None
February		
March		
April	Medium Season	Ceram Sea
May		
June		
July		North Maluku
August	Peak Season	
September		
October		
November		
December		

(Source: PT. IPERINDO, 2017)

Mina Jaya Niaga 11 is large fishing vessel which can go fishing and stay more than one month on the ocean. Therefore, for one fishing trip on Mina Jaya Niaga 11 it will take 2 month on the ocean. The operating scheme is 2 month on the ocean with 4 trips a year. The details of operating scheme on a year are presented on table 4.3.

Table 4.3 Annualy Operation Scheme

Fishing Days, No. of Sets & Hooks Deployed			
Day for operation estimation	**Days/trip**	**Trips/year**	**Days/year**
Fishing	58	4	232
Steaming to/from Fishing Ground	2	4	8
Loading and Unloading	4	4	16
Breakdowns/ Life Saving Mission	4	4	16
Bad Weather	60	1	60
Annual Drydocking/Maintenance	30	1	30
Not Operated	1	4	4
Total			366
Number of sets per trip			80
Number of hooks per set			1040
Number of hooks per trip			83200
Captain and crews on board			25

The table 4.3 shows the operating scheme of Mina Jaya Niaga 11 as tuna long-liner fishing vessel. The fishing operation will take about 60 days and going to and from the fishing ground will take up to 2 days. The annual drydocking and maintenance are conducted on January until March as it is low season for catching tuna.

4.3 Catch per Unit Effort and Long-Liner Operation

To estimate the revenue, the catchability from one long line activity must be set as parameter. To predict catchability, CPUE (Catch per Unit Effort) data must be examined. Catch are taken from catch per species in Bitung and effort are the fishing trip from Bitung Port. The CPUE must be calculated per species of the catch and the fishing gear used to catch the spesies. Tuna major catch in FMA-17 are Yellow-fin Tuna, Big-Eye Tuna, Skipjack Tuna, and other pelagic Fish.

Table 4.4 Yellow-Fin Tuna CPUE

Yellow Fin (Longliner)			
Year	**Catch (ton)**	**Effort (trips)**	**CPUE (ton)**
2010	20834	10690	1.94892423
2011	43160	10817	3.99001572
2012	42931	28078	1.52899067
2013	48426	47040	1.02946429
2014	56824	62710	0.90613937
Mean			1.88070685
Min			0.90613937
Max			3.99001572

(Source: Fishing Database, DKP)

Table 4.4 shows the CPUE of Yellow-fin Tuna by using longliner. The data are taken from 2010-2014. The catch and effort are data which taken from Bitung Port. As it can be seen the data are varied from year to year but the average of CPUE for Yellow-fin Tuna in Bitung are 1.88 ton/trips.

Table 4.5 Big-Eye Tuna CPUE

Big-Eye (Long-liner)			
Year	**Catch (ton)**	**Effort (trips)**	**CPUE (ton)**
2010	2607	10690	0.24387278
2011	7970	10817	0.73680318
2012	16843	28078	0.59986466
2013	11129	47040	0.23658588
2014	5095	62710	0.08124701
Mean			0.3796747
Min			0.08124701
Max			0.73680318

(Source: Fishing Database, DKP)

As it can be seen, table 4.5 shows the CPUE of Big-Eye Tuna in Bitung. The data are also varied from year to year. The average CPUE of Big-Eye Tuna is 0.37 ton/trips.

Table 4.6 Skipjack Tuna CPUE

Skipjack Tuna (Long-liner)			
Tahun	**Catch (ton)**	**Effort (trips)**	**CPUE (ton)**
2010	60190	10690	5.63049579
2011	60159	10817	5.56152353
2012	103901	28078	3.70044163
2013	133236	47040	2.83239796
2014	132121	62710	2.10685696
Mean			3.96634317
Min			2.10685696
Max			5.63049579

(Source: Fishing Database, DKP)

The table 4.6 are reflected the CPUE of Skipjack Tuna in Bitung. It is varied from year to year. It is estimated that the average CPUE of Skipjack Tuna is about 3.96 ton/trips.

Table 4.7 Long-lining Activity Estimation

Long-Line Operation		
Days	58	Days
Hours	1392	Hours
Average CPUE	1.383	kg/hook
Loss Factor	0.04	
CPUE used	1.328	Kg/hook
Hook	1040	
One Operation	1381.503	kg
Operation		
Setting	4	hour
Waiting	3.5	hour
Hauling and Landing Catch	9	hour
	16.5	hour
Repetition	84.36	
Estimated Catch	116548.6	kg
	116.5486	ton

From the CPUE of each species, the production from one long-lining activity can be estimated. Then the average CPUE is multiplied with the number of hook in one longline activity. It is assumed that there are loss factor which also take into

account for about 0.04 (Ward, 2007). The maximum estimate catch in one longline operation is 116548.6 kg.

Mina Jaya Niaga 11 fishing day are set to be 58 day for one fishing trip. Based on the operation scheme it need 116 repetition to complete the estimation catch and the maximum total catch for one fishing trip is 116.5486 ton as it can be seen on table 4.7.

4.4 Revenue Estimation

To estimate the revenue estimation from the scenario scheme, the maximum sustainability yield of the region is used as limitation. The MSY will regulate the maximum fishing which can be caught. If the fishing activities are conducted above MSY, the species will be endangered. Mina Jaya Niaga 11 will be operated in FMA-715. The MSY of the region is 106,500 ton/year. To prevent overcatching, the FAO regulated that each MSY should only catch by 80% of total MSY. It is called Total Allowable Catch. Therefore, the maximal fish to be caught are 85,200 ton/year.

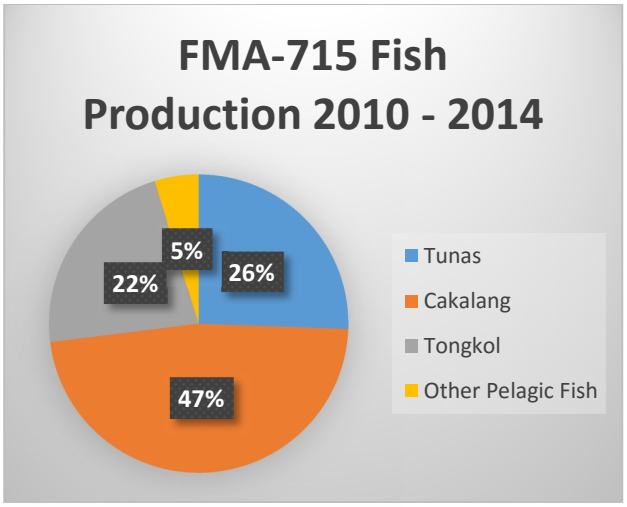

Chart 4.2 FMA-715 Fish Production
(Source: Buku Final WPP, 2014)

Figure 4.2, shows the percentage of the fish which have been caught from 2010 to 2014 in FMA-17. The data shows that about 26% of caught come from the Tuna fishes (Yellow-fin, Big-Eye) and 47% are Skipjack Tuna. The project only calculated the revenue which can be obtained from Tuna fishes and Skipjack Tuna. Therefore 60% of the FMA-715 catch is Tuna and Cakalang.

The maximum catch for one longlining activity is 116.5486 ton/trip. The tuna and cakalang composition will be 73% from the trips maximum catch. Therefore, the tuna and cakalang is about 85.080 ton/trip.

Table 4.8 Tuna and Skipjack Tuna Revenue in One Trip

Fish	Ton	Product	Price/kg (US)	Kg	Revenue
Big-Eye Tuna	6.20	Sold as Prepared and Preserve Product	3.59	6149.862	US$ 22,078
Yellow-fin	23.93	Sold as Fresh Product	3.59	23738.4	US$ 85.220
Skipjack Tuna	54.93	Sold as Fresh Product	3.45	54476.38	US$ 187.943
Total	85.080			**Total**	US$ 297.747

Table 4.8 shows the estimated revenue from the operation. Big-Eye Tuna will sell to be prepared and preserve product while Yellow-fin and Skipjack Tuna are sell as fresh product (Sunoko, 2013). The others catch such as Tongkol and other fish are sold to domestic market. The total revenue for one trip is about US$ 297.747. The currency for 1 US dollar is Rp. 13.125 according to the Mandiri on June 24th 2017. Therefore the revenue for one operation is Rp. 3,907,935,674.05 for one trip and Rp.15, 631,742,696.21 for one year operation with 4 trips.

4.5 Capital Expenditure

The capital expenditure will examine how much the investment is needed in order to make asset working. The capital expenditure is divided into two. The repairing cost to cover repairing of Mina Jaya Niaga 11 and the ship value. The refurbishment list and the price quotation are obtained from PT. IKI on 2016 while the ship value is taking from the value of similar ship with Mina Jaya Niaga 11.

4.5.1 Ship Refurbishment

Table 4.9 Repairing Cost of Mina Jaya Niaga 11

No.	Cost Component	Total Cost (Rupiah)	Percentage
1	General Docking	IDR 136,000,000.00	3.5%
2	Hull Cleaning and Painting	IDR 362,738,000.00	9.3%
3	Cathodic Protection	IDR 25,200,000.00	0.6%
4	Re-platting	IDR 612,000,000.00	15.6%
5	Tanks Cleaning, Painting, and Testing	IDR 30,500,000.00	0.8%
6	Machinery and Outfitting	IDR 1,158,100,000.00	29.6%
7	Electricity Outfitting and Freezer	IDR 258,000,000.00	6.6%
8	Safety Equipment	IDR 160,750,000.00	4.1%
9	Galleys and Toilets	IDR 60,100,000.00	1.5%
10	Engine Room and Compressor	IDR 1,109,601,000.00	28.4%
	Total	IDR 3,912,989,000.00	100.00%
	PPn	IDR 391,298,900.00	
	Grand Total	IDR 4,304,287,900.00	

(Source: PT. IKI, 2016)

Table 4.9 shows the repairing cost and price quoatation which come from PT. IKI. Machinery and outfitting are items which needed to be repair the most. Some of the equipment is taken from another ship which is not able to be finished since Mina Jaya Niaga project planned to build 34 vessel but only 14 were able to finish. Therefore there are many spare parts which still unused and still kept in the storage. To save the expenditure for buying other new parts, it is assumed that all of the equipment which needed to be replaced is taken from the parts of the vessel which not installed yet.

4.5.2 Ship Value

Table 4.10 List of Ship Value

Name	Dimention	Price
Ship 1	102.8118	IDR 2,559,375,000.00
Ship 2	210.32	IDR 4,593,750,000.00
Ship 3	370.8516	IDR 5,287,500,000.00
Mina Jaya Niaga 11	1155.84	IDR 5,563,432,195.47
Ship 4	1319.0443	IDR 6,890,625,000.00
Ship 5	1533.375	IDR 9,646,875,000.00
Ship 6	1811.805	IDR 35,437,500,000.00

(Source: Various Sources)

To obtain the ship value several ships which have the same dimention and characteristic are used as reference. The table 4.10 are shows severeal longliner steel vessels which have the same characteristic with Mina Jaya Niaga 11. The length, beam, and draught are taken as the reference to compare the price then interpolation is used to find the value of Mina Jaya Niaga 11 value. The complete details of the vessels are shows on the attachment.

4.6 Operation Expenditure

The operation expenditure is the cost to operate the asset. In this case, it is the cost per trip according to the Mina Jaya Niaga 11 scenario requirements and technical requirements.

Table 4.11 Operation Expenditure of Mina Jaya Niaga 11

No.	Cost Component	Total Cost (Per Trip)	Annual Cost
1	Fuel Oil (MDO)	IDR 1,782,000,000.00	IDR 7,128,000,000.00
2	Crew	IDR 108,750,000.00	IDR 435,000,000.00
3	Food and Provision	IDR 50,750,000.00	IDR 203,000,000.00

Table 4.11 Operation Expenditure of Mina Jaya Niaga 11 (continue)

No.	Cost Component	Total Cost (Per Trip)	Annual Cost
4	Crew Grant	IDR 29,000,000.00	IDR 116,000,000.00
5	Fresh Water	IDR 330,848.00	IDR 1,323,392.00
6	Port Cost		IDR 430,080.00
7	Bait Cost	IDR 35,850,000.00	IDR 143,400,000.00
8	Ship Maintenance		
	Long-Line	IDR 300,000,000.00	IDR 1,200,000,000.00
	Vessel		IDR 1,300,000,000.00
9	Insurance		IDR 111,268,643.91
		IDR 2,306,680,848.00	IDR 10,638,422,115.91

The table 4.10 is the operation expenditure of Mina Jaya Niaga 11 operated as Tuna Long-liner Fishing Vessel. This vessel according to the scenario given will sail for about 58 days on the sea and also will have 4 trips a year. Detail calculations are given on the attachment.

Fuel is the most expensive part in fishing vessel operation as it can be seen on figure 4.4. There are five kind of operation according to Longliner operation. The first on is going to the port. The vessel will steam from the port to the fishing ground and it usually takes more fuel as it will cruise at its optimal speed. The same goes when the vessel going from the fishing ground to the port. The other activities are setting, waiting, and hauling. The setting and hauling activity use less fuel and for waiting the vessel will drift while waiting for the catch. Another fuel consumption is come from auxiliary engine which will drive the refrigeration.

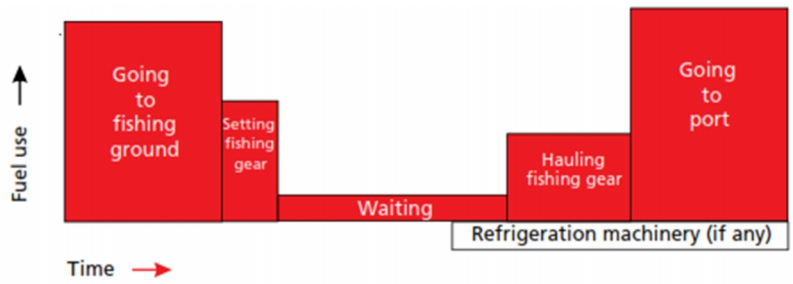

Figure 4.4 Long Liner Fuel Consumption
Source: (Gulbrandsen, 2012)

Table 4.12 Main Engine Fuel Consumption Estimation

Operation	Hour	Total Hour	Power (kW)	SFOC	Fuel Cons (g)	Fuel Cons	Unit
Go to Fishing Ground	24	24	800	200	3840000	3.84	
Setting	4	337.45	600	200	40494545	40.49	
Waiting	3.5	295.27	0	200	0	0.00	
Hauling	9	759.27	570	200	86557091	86.56	
Go to Port	24	24	800	200	3840000	3.84	
Total						134.73	ton
						153.10	m3
						153104.1322	liter

Table 4.12 shows the fuel consumption by the main engine in every operation mode. The vessel will run at its operation speed when its go to the fishing ground and go back to the port after its done fishing. For setting time and hauling usually it decreases its speed. From given scenario the total fuel consumption for main engine in one trip is 153,104.132 liter. The detail calculations are shown on the attachment.

Table 4.13 Auxiliary Engine Fuel Consumption

Operation	Hour	Days	FO Consumption (ton)	Total (ton)	Total (Liter)
Loading/Unloading	4	58.17	46.53	93.07	105757.5758
In-Operation	1392				

The most critical part which used most of fuel beside main engine is auxiliary engine. There are two auxiliary engine aboard Mina Jaya Niaga 11 with daily consume of fuel is about 0.8 ton/day/unit according Mina Jaya Niaga 11 ship particular. The auxiliary engine is driven electricity for the entire vessel, fishing gear operation, compressor for the cold storage of the ship, navigation, etc. Therefore the auxiliary engine will run continuously. There are two operation of the auxiliary engine which is assisting in loading and unloading of the fish and in-operation when it sails in the sea shown in table 4.13. The total fuel consumption is about 105,757.57 liter for both engines.

For one trip operation the vessel needs 227, 80 ton. It is about 258,861.71 liter. The total capacity of Mina Jaya Niaga 11 fuel tank is about 293 ton and it is about 332,954.545 liter according to the Mina Jaya Niaga 11 ship particular.

Therefore, the fuel consumption is adequate enough but for safety reason the Mina Jaya Niaga 11 at the given scenario will carry for about 270,000 liter.

4.6 Parameter for Financial Feasibility Study

Table 4.14 Project Assumption and Parameters

No.	Assumption	Value	Unit
1	Project Period	5	Years
2	Working Month	12	Month
3	Crews Onboard	25	Person
4	Interest Rate per Year	10	%
5	Credit Proportion		
	a. Credit from Bank	35	%
	b. Self-funded	65	%
6	Credit Time Period	4	Years
7	Tax	10%	per Years

Before conducting financial feasibility study parameters should be added. These parameters will help the financial feasibility analysis.

The assumption and parameter which is used in this project are given in table 4.12. The project period will take 5 years with 12 working month in a year. On this project it is assumed that the company loan from the bank for about 35% of project cost with the credit time period of 4 years.

4.8 Investment Planning

Table 4.15 Investment Planning

No.	Project Investment Component		Percentage	Total
1	Capital Expenditure Cost			IDR 9,867,720,095.47
		Vessel Refurbishment		IDR 4,304,287,900.00
		Vessel Value		IDR 5,563,432,195.47
	a.	Credit	50%	IDR 4,933,860,047.73
	b.	Self-funded Capital	50%	IDR 4,933,860,047.73
2	Operation Expenditure Cost			IDR 10,638,422,115.91
	a.	Credit	22%	IDR 2,306,680,848.00
	b.	Self-funded Capital	78%	IDR 8,297,969,250.41
3	Project Total Cost			IDR 20,506,142,211.38
	a.	Credit	35%	IDR 7,240,540,895.73
	b.	Self-funded Capital	65%	IDR 13,231,829,298.14

The project investment will be devided into two source, from own capital and loan from the bank. As it can be seen on table 4.13, the project total cost is Rp. 20,506,142,211.38 and about 35% will be loan form the bank and 80% will be self-funded.

The total capital expenditure are planned to be invest by 50% loan from the bank and 50% are self-funded capital. While the operation expenditure loan is used to cover the first trip of Mina Jaya Niaga 11 operations. Therefore, the total credit is Rp. 7,240,540,895.73 and it is estimated to be finished on the fourth year with the rate of 10%. The credit installment calculation will be shows on the attachment

4.9 Profit/Loss Projection and Break Even Point

Table 4.16 Profit/Loss Projection and BEP

No.	Description	Year				
		1	2	3	4	5
A.	Revenue					
	Total Revenue	IDR 15,631,742,696	IDR 15,631,742,696	IDR 15,631,742,696	IDR 15,631,742,696	IDR 15,631,742,696
B.	Expenditure					
	Operational Ex.	IDR 10,638,422,116	IDR 10,638,422,116	IDR 10,638,422,116	IDR 10,638,422,116	IDR 10,638,422,116
	Depreciation	IDR 1,112,686,439	IDR 1,112,686,439	IDR 1,112,686,439	IDR 1,112,686,439	IDR 1,112,686,439
	Rate	IDR 632,279,319	IDR 432,043,456	IDR 231,807,594	IDR 66,812,688	IDR 0
	Marketing Fee	IDR 312,634,854	IDR 312,634,854	IDR 312,634,854	IDR 312,634,854	IDR 312,634,854
	Total	IDR 12,696,022,728	IDR 12,495,786,865	IDR 12,295,551,002	IDR 12,130,556,097	IDR 12,063,743,409
C.	Profit before Tax	IDR 2,935,719,968	IDR 3,135,955,831	IDR 3,336,191,694	IDR 3,501,186,599	IDR 3,567,999,287
D.	Tax (10%)	IDR 293,571,997	IDR 313,595,583	IDR 333,619,169	IDR 350,118,660	IDR 356,799,929
E.	Profit after Tax	IDR 2,642,147,971	IDR 2,822,360,248	IDR 3,002,572,524	IDR 3,151,067,939	IDR 3,211,199,359
F.	Profit On Sales	16.90	18.06	19.21	20.16	20.54
G.	BEP : Rupiah	IDR 6,441,381,606	IDR 5,814,537,118	IDR 5,187,692,629	IDR 4,671,171,035	IDR 4,462,011,872

The table 4.14 shows the profit or loss projection during 5 years of the project. From the table, the project will generate profit (after tax) on the first year for about Rp. 2,642,147,971 with profit on sales 16.90 percent. Then the profit will be increase until Rp. 3,211,199,359 on the fifth year with profit on sales 20.54 percent. The break even point on the project is Rp. 6,441,381,606 on the first year and then it decrease to Rp. 4,462,011,872 on the fifth year. The detail calculations are shown on the attachment.

4.10 Cash Flow and Feasibility Parameter

There are some criteria which will be used to examine the feasibility aspect from the project. Those criteria are NPV (Net Present Value), IRR (internal Rate of Return), Net B/C Ratio (Net Benefit-Cost Ratio), and Payback Period.

In order to be categorized as financially feasible, the NPV of the scenario must grater than zero, IRR must be greater than the interest rate; interest rate which is used on this project is 10%, Net B/C Ratio should be greater than one point, and the project payback period must not exceed 5 years of this project.

The table 4.14 shows the result from the criteria in the given scenario. As it can be seen, the NPV are above zero, the IRR is much higher than the discount factor, the Net B/C Ratio is higher than 1, and the payback period is shorter than the project period plan. Therefore, from financial feasibility study the project is feasible. The detail calculation is shown on the attachment.

Table 4.17 Feasibility of the Project

No.	Criteria	Value	Justification
1	NPV	IDR 689,580,340.41	> 0
2	IRR	16%	> 10%
3	Net B/C Ratio	1.04	> 1
4	Payback Period	3.69	< 5 years

4.11 Sensitivity Analysis of the Project

There are two main factors which is afected the whole project. Those two factors are production cost and revenue. Any change from these factors may change the feasibility of the project. A sensitivity analysis will try to find out to what extend the project will happened. These analyses are needed in order to decrease the possibility of project fails. There will be 3 scenarios to be carried out in this sensitivity analysis.

4.10.1 Scenario I

Table 4.18 Scenario I: Revenue Decreasing 1%

No.	Criteria	Value	Justification
1	NPV	IDR 273,778,210.65	> 0
2	IRR	13%	> 10%
3	Net B/C Ratio	1.03	> 1
4	Payback Period	4.29	< 5 years

On this scenario, shown by table 4.15, the revenue from the project is decreasing to 1%. The NPV are above zero point, IRR is shown above the

interest rate, net B/C ratio are more than 1 and Payback Period is above 5 year. The decreasing may be effect of bad weather on operation or there is a breakdown on the fish sales. The feasibility analysis shows that by decreasing for about 1 percent, the project is still feasible. But if the revenue are decreasing more than 1 percent it could effect the feasibility justification as it will become not feasible.

4.10.2 Scenario II

Table 4.19 Scenario II: Operation Cost Increasing 2%

No.	Criteria	Value	Justification
1	NPV	IDR 123,619,313.66	> 0
2	IRR	11%	> 10%
3	Net B/C Ratio	1.03	> 1
4	Payback Period	4.60	< 5 years

Table 4.16 shows the project scenario if the variable cost is increasing to 2%. The table reflected that all of the criteria still on the feasibile justification. The NPV still above zero point, IRR above the interest rate, net B/C Ratio are more than 1 and payback period still below 5 years. The Increasing of the variable cost may happen because the prices are fluctuate according to the development of the economic. From the scenario II, the projects are still feasible if the variable cost increasing by 2%. The detail calculations are given on the attachment.

4.10.3 Scenario III

Table 4.20 Scenario III: Discount Rate Increasing to 13%

No.	Criteria	Value	Justification
1	NPV	IDR 30,037,937.15	> 0
2	IRR	10%	> 10%
3	Net B/C Ratio	1.03	> 1
4	Payback Period	4.33	< 5 years

Table 4.17 shows the feasibility analysis in which the discount rate is up to 16%. All of criteria shows by the increasing of 16% the project are still feasible. The detail calculations are shown on the attachment.

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CHAPTER V
CONCLUSION

5.1 Conclusion

The conclusions based on the feasibility study and data analysis which can be taken are:

1. The capital expenditure to operate the asset Mina Jaya Niaga 11 is divided into two. The repair cost and the ship value. The total repair cost in order to operate Mina Jaya Niaga 11 is about Rp. 4,304,287,900.00 and the ship value is about Rp. 5,563,432,195.47. Therefore the total capital expenditure needed is Rp. 9,867,720,095.47.

2. The operation expenditure is the cost to operate Mina Jaya Niaga 11. Based on the scenario given, the vessel will take a place in FMA-17 with the home port for landing catches in Bitung. The vessel will go fishing for about 2 month per trip and 4 trips per year with 25 crews on board. Therefore the total operation expenditure are Rp. 2,306,680,848.00 per trip and Rp. 10,638,442,115.91 per year

3. The result of feasibility study and data analysis will determined with some criteria such as NPV, IRR, Net B/C, and Payback Period. The project will have 5 years of project period, 10% investment rate, 10% discount factor, 35% credit and 65% self-funded loan with the payment period in 4 years. The analysis shows that with given scenario and assumption the project is feasible. However, sensitivity analysis result shows that if revenue decreasing only 2% the project is not feasible enough. Therefore, the project tends to sensitive with the earning of the operation.

5.2 Recommendation

The recommendations based on the project are:

1. An impact analysis of operation Mina Jaya Niaga 11 is needed because Mina Jaya Niaga 11 is a large fishing vessel and may disrupt other fisherman which used small vessels.

2. Due to its high operation expenditure, another option of Mina Jaya Niaga 11 besides fishing vessel is to be considered.

3. A new design of vessel which has the performance with Mina Jaya Niaga 11 but with low operation expenditure is to be examined.

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ATTACHMENT

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ATTACHMENT 1

REPAIR LIST AND QUOTATION

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No.	JENIS PEKERJAAN	Quantity		BIAYA	
				Satuan	Jumlah
1	2	3		4	5 = (3 x 4)
I.	**Biaya Docking**				
	General ;				
	a. Asistensi Tug Boat untuk sandar, naik / turun kapal	1	Shipset	5,000,000	5,000,000
	b. Docking / Undocking kapal	1	Shipset	20,000,000	20,000,000
	c. Kapal di atas dock	10	Hari	2,000,000	20,000,000
	d. Disediakan tempat sandar kade / tambat dilokasi dock untuk floating repair ;				
	- Sesudah docking	20	Hari	500,000	10,000,000
	e. Penundaan kapal di daerah perairan galangan	1	Shipset	4,000,000	4,000,000
	f. Bongkar dan pasang kembali dock block pada lambung kapal untuk pemeriksaan pelat, pembersihan, sandblasting dan pengecatan	1	Shipset	5,000,000	5,000,000
	Pelayanan Umum ;				
	a. Supply aliran listrik selama kapal di atas dock (380 V / 50 Hz, 3 phase 50A)	32	Hari	550,000	17,600,000
	b. Pembuangan sampah selama kapal dalam perbaikan	32	Hari	300,000	9,600,000
	c. Pemadam Kebakaran				
	- Penjagaan Kebakaran selama kapal dalam perbaikan	32	Hari	250,000	8,000,000
	e. Penjagaan kemanan selama kapal Docking dan Floating	32	Hari	400,000	12,800,000

No.	JENIS PEKERJAAN	Quantity		BIAYA	
				Satuan	Jumlah
1	2	3		4	5 = (3 x 4)
	f. Pelayanan mobil Crane (20 Ton)	16	Jam	1,500,000	24,000,000
				Sub Total (I)	Rp 136,000,000
II.	**Biaya Pemeliharaan, Pembersihan & Pengecatan**				
	1. **Lambung**				
	a. Pembersihan badan kapal ;				
	- Scraping dari Keel s/d DLL	665	M²	20,000	13,300,000
	- Water Jet dari Keel s/d LLL	465	M²	35,000	16,275,000
	- Sand blasting dari Keel s/d DLL	665	M²	60,000	39,900,000
	- Cuci air tawar pada lambung	665	M²	10,000	6,650,000
	- Sweep blasting daerah top side	350	M²	55,000	19,250,000
	b. Pengecatan Badan Kapal (Cat Suplay IKI) ;				
	- Lambung kapal dari Keel s/d LLL dilaksanakan pengecatan ;				
	- 1 x AC	465	M²	62,000	28,830,000
	- 2 x AF	465	M²	2 x 157.000	146,010,000
	- Lambung kapal dari bottop dari LLL s/d DLL dilaksanakan pengecatan ;				
	- 1 x Primer	200	M²	62,000	12,400,000
	- 1 x AC	200	M²	62,000	12,400,000
	- 2 x Bottom paint	200	M²	2 x 70.000	28,000,000
	- Pengecatan pada daerah top side ;				
	- 1 x AC	234	M²	62,000	14,508,000
	- 1 x Finish paint	117	M²	45,000	5,265,000
	- Top up bangunan atas (Amplashing 1x Finish paint)	125	M²	50,000	6,250,000
	- Thinner	180	Ltr	45,000	8,100,000
	c. Pengecatan Tanda - Tanda Kapal ;				
	- Pengecatan plimsol mark, angka draft kiri / kanan, nama kapal & tempat pendaftaran	1	Shipset	3,000,000	3,000,000
	d. Echosounder ;				
	- Dibuka, disekrap, dibersihkan dan dicat 1 x AC dan 1 x AF	2	Unit	1,300,000	2,600,000

No.	JENIS PEKERJAAN	Quantity		BIAYA	
				Satuan	Jumlah
1	2	3		4	5 = (3 x 4)
				Sub Total (II)	**Rp 362,738,000**
III.	**Biaya Cathodic Protection**				
	Cathodic Protection ;				
	- Buka / pasang zinc anodes 5,5 Kg pada lambung kapal dan kotak sea chest	42	Buah	600,000	25,200,000
				Sub Total (III)	**Rp 25,200,000**
IV.	**Biaya Pengelasan Lambung dan Penggantian Pelat**				
	- Pengelasan fitting-fitting di bawah garis air	600	Titik	30,000	18,000,000
	- Pengelasan sambungan / nat - nat yang aus	20	Mtr	200,000	4,000,000
	- Replating pelat di bawah garis air yang tipis atau bocor dan deck	20,000	Kg	29,500	590,000,000
				Sub Total (IV)	**Rp 612,000,000**
V.	**Biaya Pembersihan, Pengecatan & Pengetesan Tangki**				
	Pembersihan dan Pengecatan Tangki ;				
	- Pembersihan Tangki No.1 (P/S), No.2 (P/S), No.3 (P/S) No.4 © No.5 (P/S), Deep Tank (P/S) Stern Tank (P/S)	1	Lot	21,000,000	21,000,000
	- Pengetesan Tangki	1	Lot	9,500,000	9,500,000
				Sub Total (V)	**Rp 30,500,000**
VI.	**Biaya Mesin Out Fitting**				
	a. Pembersihan dan Pengecatan jangkar dan Rantai Jangkar ;				
	- Jangkar dan rantai jangkar kr / kn diturunkan, dibersihkan, diketok, diwater jet, dikalibrasi dan diperiksa class dan dicat dengan bituminous	2	Unit	4,500,000	9,000,000
	- Pembersihan bak rantai kiri / kanan dan dicat dengan bituminous	2	Unit	3,500,000	7,000,000
	b. Pembersihan Sea Chest ;				
	- Dibuka dan dipasang, dibersihkan dan dicat dengan 1 x AC dan 1 x AF	2	Unit	1,800,000	3,600,000
	c. Pembersihan Sea Valve ;				

No.	JENIS PEKERJAAN	Quantity		BIAYA		NEGOSIASI BIAYA	
				Satuan	Jumlah	Satuan	Jumlah
1	2	3		4	5 = (3 x 4)	6	7 = (3 x 6)
	Dibersihkan, dibuka, klep diskir terhadap seatingnya, diganti baru packing, diperiksa klas & dipasang kembali	2	Set	5,000,000	10,000,000	4,500,000	9,000,000
	d. Skerm ;						
	Buka skerm, dibersihkan, diperiksa dan ditajamkan kembali pemotong talinya, kemudian dicat 1 x AC dan 1 x AF kemudian dipasang kembali	1	Unit	2,000,000	2,000,000	2,000,000	2,000,000
	e. Kemudi dan Tongkat Kemudi ;						
	- Pengukuran clereance poros kemudi & direcord	1	Unit	2,000,000	2,000,000	2,000,000	2,000,000
	- Bongkar/ pasang kemudi/ poros untuk pemeriksaan	1	Unit	7,500,000	7,500,000	7,500,000	7,500,000
	- Ganti baru remer's packing poros kemudi	1	Set	3,500,000	3,500,000	3,000,000	3,000,000
	f. Propeller dan Shaft Propeller ;						
	- Bongkar / pasang propeller untuk pemeriksaan	1	Unit	3,500,000	3,500,000	3,500,000	3,500,000
	- Propeller dipolish dan divernis	1	Unit	2,500,000	2,500,000	2,500,000	2,500,000
	- Pengukuran surface contact baling-baling terhadap konis poros	1	Unit	2,700,000	2,700,000	2,500,000	2,500,000
	- Static balancing baling-baling & direcord	1	Unit	2,700,000	2,700,000	2,500,000	2,500,000
	- Pengukuran clreance poros propeller & direcord	1	Unit	2,500,000	2,500,000	2,000,000	2,000,000
	- Cabut poros baling - baling untuk pemeriksaan	1	Unit	11,500,000	11,500,000	11,500,000	11,500,000
	- Pemeriksaan dengan magnetic partical impact pada posisi keyway poros baling - baling	1	Unit	3,500,000	3,500,000	3,500,000	3,500,000
	- Ganti baru simplex compact seal poros baling - baling	1	Unit	20,000,000	20,000,000	20,000,000	20,000,000
	g. Mesin Induk, Mesin Bantu & Pompa-Pompa ;						
	- Top over houl Mesin Induk 1.000 Hp	1	Lot	120,000,000	120,000,000	120,000,000	120,000,000
	Spare Part	1	Lot	480,000,000	480,000,000	480,000,000	480,000,000
	- Top over houl mesin Mesin Bantu 415 Hp x 2	2	Unit	62,250,000	124,500,000	62,250,000	124,500,000
	Spare Part	1	Lot	280,000,000	280,000,000	280,000,000	280,000,000
	- Over houl pompa - pompa sewage tank	1	Unit	4,500,000	4,500,000	4,500,000	4,500,000
	- Over houl pompa - pompa hydro pore	1	Unit	3,400,000	3,400,000	3,400,000	3,400,000
	- Over houl storting air compressor 5,5 Hp	1	Unit	3,800,000	3,800,000	3,800,000	3,800,000
	- Over houl bilga general service pump 12 Hp (45 M^3 Jam)	1	Unit	6,000,000	6,000,000	6,000,000	6,000,000
	- Over houl fire general service pump 12 Hp (45 M^3 Jam)	1	Unit	6,000,000	6,000,000	6,000,000	6,000,000

No.	JENIS PEKERJAAN	Quantity		BIAYA	
				Satuan	Jumlah
1	2	3		4	5 = (3 x 4)
	- Ganti manometer air reciver	1	Buah	2,000,000	2,000,000
	- Service FO stand by pump	2	Unit	2,500,000	5,000,000
	- Ganti manometer FO stand by pump	1	Buah	2,000,000	2,000,000
	- Ganti manometer fire GS & PDU pump	2	Buah	2,000,000	4,000,000
	- Ganti thermometer gas buang no.1 M/E	1	Buah	3,100,000	3,100,000
	- Service/perbaikan pompa pendingin air laut M/E	1	Unit	3,100,000	3,100,000
	- Perbaikan electric RPM M/E & As Propeller	2	Unit	2,600,000	5,200,000
	- Perbaikan regulator governor A/E (ki/ka)	2	Unit	6,000,000	12,000,000
	Sub Total (VI) ..... Rp				**1,158,100,000**
VII.	**Biaya Listrik Outfitting dan Freezing**				
	a. Megger test instalasi kapal / MSB	1	Lot	5,000,000	5,000,000
	b. Penggantian baru Accu 200 AH	8	Buah	3,500,000	28,000,000
	c. Pengisian Gas freon R - 22	500	Ltr	450,000	225,000,000
	Sub Total (VII) ..... Rp				**258,000,000**
VIII	**Biaya Alat-Alat Keselamatan**				
	a. Foam fire extinguishe with trolly 45 Kg	1	Botol	4,500,000	4,500,000
	b. Halon fire fighting MHS - 5,5 Kg	2	Botol	2,500,000	5,000,000
	c. Por table CO^2 6,8 Kg	5	Botol	2,750,000	13,750,000
	d. Redhand flare, smoke signal, parachute signal, dan LT. Apparatus	1	Lot	16,500,000	16,500,000
	e. Service Life Raft cap. 16 person	2	Unit	8,000,000	16,000,000
	f. Service Life Raft cap. 10 person	2	Unit	7,500,000	15,000,000
	g. Pengadaan pesawat Navtex/ Sart	1	Set	90,000,000	90,000,000
	Sub Total (VIII) Rp				**160,750,000**
X	**Biaya Perbaikan / Penggantian Equipment Yg Rusak**				
	a. Water Closet (WC)				
	- Push water closet	1	Set	4,500,000	4,500,000
	b. Galley (dapur)				
	- Kran wash basin dia. 1/2 double valve	1	Unit	350,000	350,000
	- Kran air tawar dia 1/2 kitz	1	Unit	250,000	250,000
	c. Rescue Boat (6 Person)	1	Unit	55,000,000	55,000,000

No.	JENIS PEKERJAAN	Quantity		BIAYA		NEGOSIASI BIAYA	
				Satuan	Jumlah	Satuan	Jumlah
1	2	3		4	5 = (3 x 4)	6	7 = (3 x 6)
	Sub Total (X)				Rp 60,100,000		Rp 60,100,000
XII	**Ruang Mesin dan Kompressor**						
	A. Kamar Mesin						
	- Pasang baru globe valve (bronze)						
	- Pompa transfer FO Mesin Induk uk. Ø 1"	2	Bh	3,350,000	6,700,000	3,350,000	6,700,000
	- Filter FO Mesin Induk uk. Ø 1"	4	Bh	3,350,000	13,400,000	3,350,000	13,400,000
	- Transfer Tangki Harian FO uk. Ø 1"	8	Bh	3,350,000	26,800,000	3,350,000	26,800,000
	- Transfer Separator FO uk. Ø 1"	2	Bh	3,350,000	6,700,000	3,350,000	6,700,000
	- Transfer Separator LO uk. Ø 1"	2	Bh	3,350,000	6,700,000	3,350,000	6,700,000
	- Ganti baru pipa radiator AE kanan kiri	2	Bh	17,150,000	34,300,000	17,150,000	34,300,000
	- Ganti baru pipa caviler pendingin LO	1	Bh	2,150,000	2,150,000	2,150,000	2,150,000
	- Ganti baru pipa caviler pendingin FW	1	Bh	2,150,000	2,150,000	2,150,000	2,150,000
	- Ganti baru pompa SW Pendingin Mesin Induk	1	Set	31,250,000	31,250,000	31,250,000	31,250,000
	- Ganti baru pompa transfer FW Oasis	1	Set	29,500,000	29,500,000	29,500,000	29,500,000
	- Ganti baru pompa SW Oasis	1	Set	29,500,000	29,500,000	29,500,000	29,500,000
	- Ganti baru pompa Hydrophore SW - FW	2	Set	3,400,000	6,800,000	3,400,000	6,800,000
	- Overhoul pompa Hydrophore	1	Unit	3,400,000	3,400,000	3,400,000	3,400,000
	- Overhoul pompa GS/ Bilge	2	Unit	6,000,000	12,000,000	6,000,000	12,000,000
	- Ganti baru Mechanical Seal	2	Bh	635,000	1,270,000	635,000	1,270,000
	- Buka dan Perawatan Saringan Pipa Induk uk. Ø 25"	2	Bh	4,375,000	8,750,000	4,375,000	8,750,000
	- Buka dan Service Overboar Valve ;						
	- GS/ Bilga uk. Ø 3"	2	Bh	950,000	1,900,000	950,000	1,900,000
	- Mesin Induk uk. Ø 2½"	1	Bh	875,000	875,000	875,000	875,000
	- Mesin Bantu uk. Ø 2"	2	Bh	700,000	1,400,000	700,000	1,400,000
	- Sewage uk. Ø 4"	1	Bh	1,400,000	1,400,000	1,400,000	1,400,000
	- AC Central uk. Ø 1"	1	Bh	550,000	550,000	550,000	550,000
	- Cold Store uk. Ø 1" Steern Room	1	Bh	550,000	550,000	550,000	550,000
	- Pendingin Compressor Mycom uk. Ø 5"	1	Bh	1,750,000	1,750,000	1,750,000	1,750,000
	- Buka dan sevice isap valve kompressor mycom uk. Ø 5"	2	Bh	1,750,000	3,500,000	1,750,000	3,500,000
	B. Ruang Kompressor						

No.	JENIS PEKERJAAN	Quantity		BIAYA	
				Satuan	Jumlah
1	2	3		4	5 = (3 x 4)
	- Buka pipa kondensor mycom				
	- Pipa Sch. 40 uk. Ø 2" x 500 x 2 Buah	2	Bh	615,000	1,230,000
	- Elbow uk. Ø 2" x 4 Buah	4	Bh	192,500	770,000
	- Ganti baru kaca sight glass pipa condensor	2	Bh	850,000	1,700,000
	- Ganti baru bush bar MSB termasuk kabel instalasi	1	Set	372,000,000	372,000,000
	- Ganti baru bush bar panel compressor dan instalasinya	1	Set	186,000,000	186,000,000
	- Overhoul Compressor Mycom	4	Unit	42,000,000	168,000,000
	C. Main Deck				
	- Ganti baru pondasi deck grating yang keropos	1	Lot	32,500,000	32,500,000
	- Siku uk. 50 x 50 x 12 Btg				
	- Plat Strip uk. 100 x 5mm x 12 Btg				
	- Buka peralatan fishing gear				
	- Line Hauler	1	Unit	4,250,000	4,250,000
	- Float Rell	1	Unit	4,250,000	4,250,000
	- Bran Rell	1	Unit	3,250,000	3,250,000
	- Line Casting	1	Unit	4,250,000	4,250,000
	- Line Arranger	1	Unit	4,250,000	4,250,000
	- Buka Alow Compeyor Belt termasuk pondasi depan/ belakang	2	Set	4,150,000	8,300,000
	- Buka Line Compeyor Belt termasuk pondasinya	1	Set	5,250,000	5,250,000
	- Buka Tangga Main Deck ke Winch Deck	1	Unit	500,000	500,000
	- Pasang Baru Dewi - Dewi pada Main Deck Cap 500 Kg	1	Unit	2,300,000	2,300,000
	- Ganti baru kayu deck grating pada pop deck				
	- Balok uk. 15 x 7cm x 80 x 24 Btg	24	Batang	675,250	16,206,000
	- Mur baut uk. Ø ½" x 2" x 48 Bh	48	Bh	25,000	1,200,000
	- Dempul Flincoat				
	- Buka dan service valve cuci jangkar kanan kiri uk. Ø 3"	2	Bh	1,350,000	2,700,000
	- Perbaikan Realling Haluan ;	1	Ls	850,000	850,000
	- Pipa uk. Ø 40A x 2500 x 1 Btg				
	- Round bar uk. Ø ¾" x 2500 x 2 Btg				
	- Buat baru penutup palka fish hold pada main deck	2	Bh	13,650,000	27,300,000

No.	JENIS PEKERJAAN	Quantity		BIAYA	
				Satuan	Jumlah
1	2	3		4	5 = (3 x 4)
	- Perbaikan pintu masuk handling room	1	Bh	5,925,000	5,925,000
	D. Whell House				
	- Ganti baru Flywood anak tangga dari gang way ke	3	Bh	450,000	1,350,000
	- Service AC Central Anjungan	1	Unit	17,500,000	17,500,000
	- Ganti Pipa GS fire pafda gang way pop deck				
	- Pipa uk. Ø 4" x 2" x 1 Bh	1	Bh	975,000	975,000
	E. Streen Gear				
	- Ganti pipa freon cold store				
	- Pipa Tembaga uk. Ø 1" x 2500 x 2 Btg	2	Bh	775,000	1,550,000
	- Buka dan Service Bilge Handpump	1	Bh	1,950,000	1,950,000
				Sub Total (XII)	**Rp 1,109,601,000**
				Total (I - XII)	**Rp 3,912,989,000**

Rp. 3,912,989,000.00 + 391,298,900 = 4,304,287,900.00

ATTACHMENT 2

REPAIR LIST AND QUOTATION

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Vessel 1	http://www.molajaya-fishingwork.com/2012/08/tuna-longline-for-sale.html
GT	97
L	27.03
B	5.6
T	2.45
Production	1998
Price	JPY 45,000,000.00
	IDR 5,287,500,000.00

Vessel 2	https://horizonship.com/ship/47m-tuna-freezer-long-liner/
GT	380
L	47
B	8.7
T	3.75
Production	1988
Price	$ 735,000.00
	IDR 9,646,875,000.00

Vessel 3	https://horizonship.com/ship/43m-tuna-freezer-long-liner/
GT	350
L	43.54
B	8.3
T	3.65
Production	1979
Price	$ 525,000.00
	$ 6,890,625,000.00

Vessel 4	http://www.shipseller.net/details.php?id=7456
GT	69
L	22
B	4.78
T	2
Production	1989
Price	$ 350,000.00
	$ 4,593,750,000.00

Vessel 5	http://www.shipseller.net/details.php?id=3010
GT	unkown
L	18.83
B	4.2
T	1.3
Production	1990
Price	$ 195,000.00
	$ 2,559,375,000.00

Vessel 6	http://www.shipseller.net/details.php?id=4201
GT	708
L	56.18
B	8.6
T	3.75
Production	1999
Price	$ 2,700,000.00
	$ 35,437,500,000.00

ATTACHMENT 3

BITUNG PORT FACILITIES

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Sarana	Infrastruktur	Keterangan
Pokok	Dermaga I (*stair landing wharf*)	Ukuran: P= 126 m x L= 14 m Bobot kapal 30-600 ton Kedalaman <5 m LWS
	Dermaga II (*carrier wharf*)	Ukuran: P= 115 m x L= 14 m Bobot kapal 5- 30 ton Kedalaman <1.5 m LWS
	Jalan Kompleks	- Jalan utama (1.648 m^2) - Jalan kios (433 m2) - Jalan mess operator (429 m2) - Jalan industri (802,5 m^2), perkerasan *asphalt hot mix* dan sebagian aspal penetrasi
Fungsional	Lahan/areal pelabuhan	Luas total 4,6 Ha (reklamasi 1 Ha)
	Gapura	440 m^2
	Kantor PPS Bitung	605 m^2
	Tempat pelelangan ikan	1.242 m^2
	MCK umum	50 m^2
	Pos jaga	12 m^2
	Kantor pengawasan	195 m^2
	Kantor Dinas KP Bitung	406,25 m^2
	Drainase	490 m^2
	Penampungan air bersih	40 m^2
	Pagar keliling	299,71 m^2
	Rumah dinas pimpinan	150 m^2
	Mess operator	108 m^2
	Mushola	135,52 m^2
	Gereja	800 m^2
	Taman pelabuhan	1.424,38 m^2
	IPAL	100 m^2
	Kapasitas tanki BBM	100 kilo liter
Penunjang	Kios pesisir:	
	- Tahap I (12 unit)	24,90 m^2
	- Tahap I (3 unit)	30,71 m^2
	- Tahap II (8 unit)	26,25 m^2
	- Tahap II (1 unit)	28,69 m^2
	Pos kesehatan masyarakat	63 m^2
	MCK	45 m^2
	Gedung laboratorium	603 m^2

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ATTACHMENT 4

OPERATION EXPENDITURE DETAIL

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No.	Cost Component	Requirement	Unit	Unit Price	Unit	Total Cost (Per Trip)	Annual Cost
1	Fuel Oil (MDO)	270000	Liter	IDR 6,600.00	Per liter	IDR 1,782,000,000.00	IDR 7,128,000,000.00
2	Crew	25	Person	IDR 75,000.00	Per Person Per Day	IDR 108,750,000.00	IDR 435,000,000.00
3	Food and Provision	25	Person	IDR 35,000.00	Per Person Per Day	IDR 50,750,000.00	IDR 203,000,000.00
4	Crew Grant	25	Person	IDR 20,000.00	Per Person Per Day	IDR 29,000,000.00	IDR 116,000,000.00
5	Fresh Water	33.76	m3	IDR 9,800.00	Per m3	IDR 330,848.00	IDR 1,323,392.00
6	Port Cost	512	GT	IDR 70.00	Per GT Per Month		IDR 430,080.00
7	Bait Cost	14340	kg	IDR 2,500.00	Per Kilogram	IDR 35,850,000.00	IDR 143,400,000.00
8	Ship Maintenance						
	Long-Line	300000000	Per Trip			IDR 300,000,000.00	IDR 1,200,000,000.00
	Vessel	1300000000	Per Year				IDR 1,300,000,000.00
9	Insurance	111268643.9	Per Year				IDR 111,268,643.91
	Total					IDR 2,306,680,848.00	IDR 10,638,422,115.91

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ATTACHMENT 5

MAIN ENGINE SPECIFICATION

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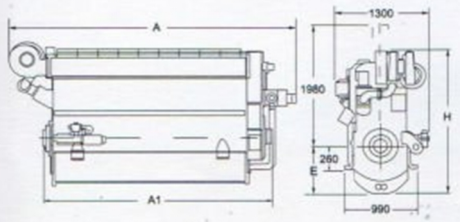
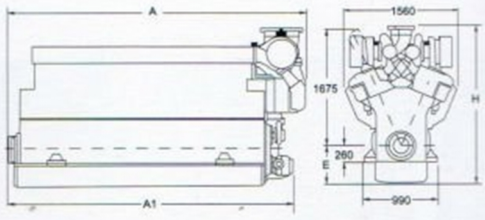
MAN 8L20/27 marine engine
Bore*stroke 200*270mm
Cylinders: L8
Power: 576/720 600/750 720/900 800/1000 kw/rpm

MAN 8L20/27 marine engine
Bore*stroke 200*270mm
Cylinders: L8
Power: 576/720 600/750 720/900 800/1000 kw/rpm
Dimension: 3550*1330*2100 mm
Weight: 7.4T



直列（L）型



V型

额定功率

机 型 Engine type	功 率 (kW) Power				外形尺寸(mm) Overall dimensions				净重 吨 Dry weight in tons
	720r/min	750r/min	900r/min	1000r/min	A	A1	E	H	
6L20/27	432	450	540	600	2950	2170	667	2100	6.1
7L20/27	504	525	630	700	3250	2450	710	2100	6.7
8L20/27	576	600	720	800	3550	2730	710	2100	7.4
9L20/27	648	675	810	900	3800	3010	710	2100	8.1
12V20/27	864	900	1080	1200	3350	3090	650	2500	10.9

主要参数

		直列	V型
结构 Configuration		直列	V型
气缸数量 Number of cylinder		6、7、8、9	12
单缸功率 Rated power of unit	kW/cyl	72/75/90/100	72/75/90/100
转速 Rated speed	r/min	720/750/900/1000	720/750/900/1000
缸径 Bore	mm	200	200
冲程 Stroke	mm	270	270
气缸间距 Cylinder distance	mm	280	350
平均有效压力 Mean eff. Pressure	MPa	1.40	1.40
平均活塞速度 Mean piston speed	m/s	6.48/6.75/8.1/9	6.48/6.75/8.1/9
压缩比(轻油/重油) Compression ratio（MDO/HFO）		13.37/13.56	13.37/13.56
燃油 Fuel oil acceptance		MGO、MDO、HFO	MGO、MDO、HFO
燃油消耗率 Spec.fuel oil consumption	g/kWh	200	200
滑油 Lubricating oil	Grade	SAE 30	SAE 30
滑油消耗率 Spec.lub oil consumption	g/kWh	1.23～1.83	1.29～1.75

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ATTACHMENT 6
PLANNED INVESTMENT

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No.	Project Investment Component		Percentage	Total
1	**Capital Expenditure Cost**			**IDR 9,867,720,095.47**
		Vessel Refurbishment		**IDR 4,304,287,900.00**
		Vessel Value		**IDR 5,563,432,195.47**
	a.	Credit	50%	IDR 4,933,860,047.73
	b.	Self-funded Capital	50%	IDR 4,933,860,047.73
2	**Operation Expenditure Cost**			**IDR 10,638,422,115.91**
	a.	Credit	22%	IDR 2,306,680,848.00
	b.	Self-funded Capital	78%	IDR 8,297,969,250.41
3	**Project Total Cost**			**IDR 20,506,142,211.38**
	a.	Credit	35%	IDR 7,240,540,895.73
	b.	Self-funded Capital	65%	IDR 13,231,829,298.14

Year	Fix Installment	Rate Installment	Total	Beginning Balance	Ending Balance
0				IDR 7,240,540,895.73	IDR 7,240,540,895.73
1	IDR 2,002,358,627.93	IDR 632,279,319.13	IDR 2,634,637,947.06	IDR 7,240,540,895.73	IDR 5,238,182,267.80
2	IDR 2,002,358,627.93	IDR 432,043,456.33	IDR 2,434,402,084.27	IDR 5,238,182,267.80	IDR 3,235,823,639.87
3	IDR 2,002,358,627.93	IDR 231,807,593.54	IDR 2,234,166,221.47	IDR 3,235,823,639.87	IDR 1,233,465,011.93
4	IDR 1,233,465,011.93	IDR 66,812,688.15	IDR 1,300,277,700.08	IDR 1,233,465,011.93	IDR 0.00

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ATTACHMENT 7

RATE (BANK INDONESIA)

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I.26 INTEREST RATE OF RUPIAH LOANS BY GROUP OF BANKS
(Percent Per Annum)

2016										2017					GROUP OF BANKS AND TYPE OF LOANS	1
Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May		
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	***State Banks***	*1*
12.05	11.83	11.68	11.52	11.44	11.36	11.19	11.15	11.09	10.86	10.89	10.86	10.78	10.89	10.87	*Working Capital Loans*	*2*
11.18	11.04	10.99	10.89	10.84	10.81	10.72	10.71	10.63	10.43	10.45	10.40	10.36	10.55	10.48	*Investment Loans*	*3*
13.20	13.24	13.28	13.22	13.22	13.21	13.18	13.13	13.09	13.04	13.06	13.04	12.97	13.05	12.87	*Consumer Loans*	*4*
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	***Regional Government Banks***	*5*
13.14	13.12	12.62	12.80	12.78	12.75	12.76	12.69	12.65	12.59	12.48	12.32	12.17	12.14	12.32	*Working Capital Loans*	*6*
12.16	12.09	11.81	11.77	11.63	11.61	11.76	11.60	11.42	11.49	11.46	11.48	11.47	11.42	10.43	*Investment Loans*	*7*
13.50	13.46	13.20	13.24	13.23	13.19	13.17	13.15	13.12	13.11	13.10	13.10	13.06	13.04	13.01	*Consumer Loans*	*8*
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	***Private National Banks***	*9*
12.81	12.73	12.58	12.43	12.40	12.38	12.31	12.31	12.22	12.10	12.07	11.96	11.91	11.82	11.73	*Working Capital Loans*	*10*
12.40	12.32	12.18	12.08	12.04	12.02	11.97	11.98	12.05	11.94	11.88	11.78	11.74	11.65	11.52	*Investment Loans*	*11*
13.61	13.59	13.58	13.57	13.56	13.42	13.40	13.38	13.35	13.28	13.24	13.20	13.10	13.20	13.12	*Consumer Loans*	*12*
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	***Foreign Banks and Joint Banks***	*13*
10.06	9.90	9.75	9.64	9.61	9.44	9.35	9.27	9.21	9.21	9.04	8.95	8.88	8.74	8.66	*Working Capital Loans*	*14*
10.83	10.52	10.34	10.28	10.35	10.37	10.29	10.16	10.12	10.32	10.03	9.91	9.83	9.82	9.85	*Investment Loans*	*15*
29.23	29.26	29.25	29.36	29.15	28.69	28.76	28.63	28.51	28.45	28.19	28.03	27.85	27.85	27.86	*Consumer Loans*	*16*
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	***Commercial Banks***	*17*
12.28	12.14	11.97	11.82	11.78	11.73	11.61	11.59	11.52	11.36	11.34	11.26	11.19	11.20	11.15	*Working Capital Loans*	*18*
11.83	11.71	11.60	11.49	11.45	11.42	11.36	11.34	11.33	11.21	11.17	11.10	11.05	11.10	10.96	*Investment Loans*	*19*
13.91	13.91	13.86	13.83	13.82	13.74	13.72	13.68	13.65	13.59	13.58	13.56	13.48	13.48	13.37	*Consumer Loans*	*20*

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ATTACHMENT 8
CREDIT INSTALLMENT

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Capital Credt

Period	Credit	Fix Installment	Rate	Total	Beginning Balance	Ending Balance
	IDR 4,933,860,047.73				IDR 4,933,860,047.73	IDR 4,933,860,047.73
Month 1		IDR 102,788,750.99	IDR 41,115,500.40	IDR 143,904,251.39	IDR 4,933,860,047.73	IDR 4,831,071,296.74
Month 2		IDR 102,788,750.99	IDR 40,258,927.47	IDR 143,047,678.47	IDR 4,831,071,296.74	IDR 4,728,282,545.74
Month 3		IDR 102,788,750.99	IDR 39,402,354.55	IDR 142,191,105.54	IDR 4,728,282,545.74	IDR 4,625,493,794.75
Month 4		IDR 102,788,750.99	IDR 38,545,781.62	IDR 141,334,532.62	IDR 4,625,493,794.75	IDR 4,522,705,043.76
Month 5		IDR 102,788,750.99	IDR 37,689,208.70	IDR 140,477,959.69	IDR 4,522,705,043.76	IDR 4,419,916,292.76
Month 6		IDR 102,788,750.99	IDR 36,832,635.77	IDR 139,621,386.77	IDR 4,419,916,292.76	IDR 4,317,127,541.77
Month 7		IDR 102,788,750.99	IDR 35,976,062.85	IDR 138,764,813.84	IDR 4,317,127,541.77	IDR 4,214,338,790.77
Month 8		IDR 102,788,750.99	IDR 35,119,489.92	IDR 137,908,240.92	IDR 4,214,338,790.77	IDR 4,111,550,039.78
Month 9		IDR 102,788,750.99	IDR 34,262,917.00	IDR 137,051,667.99	IDR 4,111,550,039.78	IDR 4,008,761,288.78
Month 10		IDR 102,788,750.99	IDR 33,406,344.07	IDR 136,195,095.07	IDR 4,008,761,288.78	IDR 3,905,972,537.79
Month 11		IDR 102,788,750.99	IDR 32,549,771.15	IDR 135,338,522.14	IDR 3,905,972,537.79	IDR 3,803,183,786.79
Month 12		IDR 102,788,750.99	IDR 31,693,198.22	IDR 134,481,949.22	IDR 3,803,183,786.79	IDR 3,700,395,035.80
Year-1		**IDR 1,233,465,011.93**	**IDR 436,852,191.73**	**IDR 1,670,317,203.66**		
	IDR 4,933,860,047.73					
Month 1		IDR 102,788,750.99	IDR 30,836,625.30	IDR 133,625,376.29	IDR 3,700,395,035.80	IDR 3,597,606,284.81
Month 2		IDR 102,788,750.99	IDR 29,980,052.37	IDR 132,768,803.37	IDR 3,597,606,284.81	IDR 3,494,817,533.81
Month 3		IDR 102,788,750.99	IDR 29,123,479.45	IDR 131,912,230.44	IDR 3,494,817,533.81	IDR 3,392,028,782.82
Month 4		IDR 102,788,750.99	IDR 28,266,906.52	IDR 131,055,657.52	IDR 3,392,028,782.82	IDR 3,289,240,031.82
Month 5		IDR 102,788,750.99	IDR 27,410,333.60	IDR 130,199,084.59	IDR 3,289,240,031.82	IDR 3,186,451,280.83
Month 6		IDR 102,788,750.99	IDR 26,553,760.67	IDR 129,342,511.67	IDR 3,186,451,280.83	IDR 3,083,662,529.83
Month 7		IDR 102,788,750.99	IDR 25,697,187.75	IDR 128,485,938.74	IDR 3,083,662,529.83	IDR 2,980,873,778.84
Month 8		IDR 102,788,750.99	IDR 24,840,614.82	IDR 127,629,365.82	IDR 2,980,873,778.84	IDR 2,878,085,027.84
Month 9		IDR 102,788,750.99	IDR 23,984,041.90	IDR 126,772,792.89	IDR 2,878,085,027.84	IDR 2,775,296,276.85
Month 10		IDR 102,788,750.99	IDR 23,127,468.97	IDR 125,916,219.97	IDR 2,775,296,276.85	IDR 2,672,507,525.86
Month 11		IDR 102,788,750.99	IDR 22,270,896.05	IDR 125,059,647.04	IDR 2,672,507,525.86	IDR 2,569,718,774.86
Month 12		IDR 102,788,750.99	IDR 21,414,323.12	IDR 124,203,074.12	IDR 2,569,718,774.86	IDR 2,466,930,023.87
Year-2		**IDR 1,233,465,011.93**	**IDR 313,505,690.53**	**IDR 1,546,970,702.47**		
	IDR 4,933,860,047.73				IDR 2,466,930,023.87	IDR 2,466,930,023.87
Month 1		IDR 102,788,750.99	IDR 20,557,750.20	IDR 123,346,501.19	IDR 2,466,930,023.87	IDR 2,364,141,272.87
Month 2		IDR 102,788,750.99	IDR 19,701,177.27	IDR 122,489,928.27	IDR 2,364,141,272.87	IDR 2,261,352,521.88
Month 3		IDR 102,788,750.99	IDR 18,844,604.35	IDR 121,633,355.34	IDR 2,261,352,521.88	IDR 2,158,563,770.88
Month 4		IDR 102,788,750.99	IDR 17,988,031.42	IDR 120,776,782.42	IDR 2,158,563,770.88	IDR 2,055,775,019.89
Month 5		IDR 102,788,750.99	IDR 17,131,458.50	IDR 119,920,209.49	IDR 2,055,775,019.89	IDR 1,952,986,268.89
Month 6		IDR 102,788,750.99	IDR 16,274,885.57	IDR 119,063,636.57	IDR 1,952,986,268.89	IDR 1,850,197,517.90
Month 7		IDR 102,788,750.99	IDR 15,418,312.65	IDR 118,207,063.64	IDR 1,850,197,517.90	IDR 1,747,408,766.91
Month 8		IDR 102,788,750.99	IDR 14,561,739.72	IDR 117,350,490.72	IDR 1,747,408,766.91	IDR 1,644,620,015.91
Month 9		IDR 102,788,750.99	IDR 13,705,166.80	IDR 116,493,917.79	IDR 1,644,620,015.91	IDR 1,541,831,264.92
Month 10		IDR 102,788,750.99	IDR 12,848,593.87	IDR 115,637,344.87	IDR 1,541,831,264.92	IDR 1,439,042,513.92
Month 11		IDR 102,788,750.99	IDR 11,992,020.95	IDR 114,780,771.94	IDR 1,439,042,513.92	IDR 1,336,253,762.93
Month 12		IDR 102,788,750.99	IDR 11,135,448.02	IDR 113,924,199.02	IDR 1,336,253,762.93	IDR 1,233,465,011.93
Year-3		**IDR 1,233,465,011.93**	**IDR 190,159,189.34**	**IDR 1,423,624,201.27**		
	IDR 4,933,860,047.73				IDR 1,233,465,011.93	IDR 1,233,465,011.93
Month 1		IDR 102,788,750.99	IDR 10,278,875.10	IDR 113,067,626.09	IDR 1,233,465,011.93	IDR 1,130,676,260.94
Month 2		IDR 102,788,750.99	IDR 9,422,302.17	IDR 112,211,053.17	IDR 1,130,676,260.94	IDR 1,027,887,509.94
Month 3		IDR 102,788,750.99	IDR 8,565,729.25	IDR 111,354,480.24	IDR 1,027,887,509.94	IDR 925,098,758.95
Month 4		IDR 102,788,750.99	IDR 7,709,156.32	IDR 110,497,907.32	IDR 925,098,758.95	IDR 822,310,007.96
Month 5		IDR 102,788,750.99	IDR 6,852,583.40	IDR 109,641,334.39	IDR 822,310,007.96	IDR 719,521,256.96
Month 6		IDR 102,788,750.99	IDR 5,996,010.47	IDR 108,784,761.47	IDR 719,521,256.96	IDR 616,732,505.97
Month 7		IDR 102,788,750.99	IDR 5,139,437.55	IDR 107,928,188.54	IDR 616,732,505.97	IDR 513,943,754.97
Month 8		IDR 102,788,750.99	IDR 4,282,864.62	IDR 107,071,615.62	IDR 513,943,754.97	IDR 411,155,003.98
Month 9		IDR 102,788,750.99	IDR 3,426,291.70	IDR 106,215,042.69	IDR 411,155,003.98	IDR 308,366,252.98
Month 10		IDR 102,788,750.99	IDR 2,569,718.77	IDR 105,358,469.77	IDR 308,366,252.98	IDR 205,577,501.99
Month 11		IDR 102,788,750.99	IDR 1,713,145.85	IDR 104,501,896.84	IDR 205,577,501.99	IDR 102,788,750.99
Month 12		IDR 102,788,750.99	IDR 856,572.92	IDR 103,645,323.92	IDR 102,788,750.99	IDR 0.00
Year-4		**IDR 1,233,465,011.93**	**IDR 66,812,688.15**	**IDR 1,300,277,700.08**		

Operation Credit

Period	Credit	Fix Installment	Rate	Total	Beginning Balance	Ending Balance
	IDR 2,306,680,848.00				IDR 2,306,680,848.00	IDR 2,306,680,848.00
Month 1		IDR 64,074,468.00	IDR 19,222,340.40	IDR 83,296,808.40	IDR 2,306,680,848.00	IDR 2,242,606,380.00
Month 2		IDR 64,074,468.00	IDR 18,688,386.50	IDR 82,762,854.50	IDR 2,242,606,380.00	IDR 2,178,531,912.00
Month 3		IDR 64,074,468.00	IDR 18,154,432.60	IDR 82,228,900.60	IDR 2,178,531,912.00	IDR 2,114,457,444.00
Month 4		IDR 64,074,468.00	IDR 17,620,478.70	IDR 81,694,946.70	IDR 2,114,457,444.00	IDR 2,050,382,976.00
Month 5		IDR 64,074,468.00	IDR 17,086,524.80	IDR 81,160,992.80	IDR 2,050,382,976.00	IDR 1,986,308,508.00
Month 6		IDR 64,074,468.00	IDR 16,552,570.90	IDR 80,627,038.90	IDR 1,986,308,508.00	IDR 1,922,234,040.00
Month 7		IDR 64,074,468.00	IDR 16,018,617.00	IDR 80,093,085.00	IDR 1,922,234,040.00	IDR 1,858,159,572.00
Month 8		IDR 64,074,468.00	IDR 15,484,663.10	IDR 79,559,131.10	IDR 1,858,159,572.00	IDR 1,794,085,104.00
Month 9		IDR 64,074,468.00	IDR 14,950,709.20	IDR 79,025,177.20	IDR 1,794,085,104.00	IDR 1,730,010,636.00
Month 10		IDR 64,074,468.00	IDR 14,416,755.30	IDR 78,491,223.30	IDR 1,730,010,636.00	IDR 1,665,936,168.00
Month 11		IDR 64,074,468.00	IDR 13,882,801.40	IDR 77,957,269.40	IDR 1,665,936,168.00	IDR 1,601,861,700.00
Month 12		IDR 64,074,468.00	IDR 13,348,847.50	IDR 77,423,315.50	IDR 1,601,861,700.00	IDR 1,537,787,232.00
Year-1		**IDR 768,893,616.00**	**IDR 195,427,127.40**	**IDR 964,320,743.40**		
	IDR 2,306,680,848.00					
Month 1		IDR 64,074,468.00	IDR 12,814,893.60	IDR 76,889,361.60	IDR 1,537,787,232.00	IDR 1,473,712,764.00
Month 2		IDR 64,074,468.00	IDR 12,280,939.70	IDR 76,355,407.70	IDR 1,473,712,764.00	IDR 1,409,638,296.00
Month 3		IDR 64,074,468.00	IDR 11,746,985.80	IDR 75,821,453.80	IDR 1,409,638,296.00	IDR 1,345,563,828.00
Month 4		IDR 64,074,468.00	IDR 11,213,031.90	IDR 75,287,499.90	IDR 1,345,563,828.00	IDR 1,281,489,360.00
Month 5		IDR 64,074,468.00	IDR 10,679,078.00	IDR 74,753,546.00	IDR 1,281,489,360.00	IDR 1,217,414,892.00
Month 6		IDR 64,074,468.00	IDR 10,145,124.10	IDR 74,219,592.10	IDR 1,217,414,892.00	IDR 1,153,340,424.00
Month 7		IDR 64,074,468.00	IDR 9,611,170.20	IDR 73,685,638.20	IDR 1,153,340,424.00	IDR 1,089,265,956.00
Month 8		IDR 64,074,468.00	IDR 9,077,216.30	IDR 73,151,684.30	IDR 1,089,265,956.00	IDR 1,025,191,488.00
Month 9		IDR 64,074,468.00	IDR 8,543,262.40	IDR 72,617,730.40	IDR 1,025,191,488.00	IDR 961,117,020.00
Month 10		IDR 64,074,468.00	IDR 8,009,308.50	IDR 72,083,776.50	IDR 961,117,020.00	IDR 897,042,552.00
Month 11		IDR 64,074,468.00	IDR 7,475,354.60	IDR 71,549,822.60	IDR 897,042,552.00	IDR 832,968,084.00
Month 12		IDR 64,074,468.00	IDR 6,941,400.70	IDR 71,015,868.70	IDR 832,968,084.00	IDR 768,893,616.00
Year-2		**IDR 768,893,616.00**	**IDR 118,537,765.80**	**IDR 887,431,381.80**		
	IDR 2,306,680,848.00					
Month 1		IDR 64,074,468.00	IDR 6,407,446.80	IDR 70,481,914.80	IDR 768,893,616.00	IDR 704,819,148.00
Month 2		IDR 64,074,468.00	IDR 5,873,492.90	IDR 69,947,960.90	IDR 704,819,148.00	IDR 640,744,680.00
Month 3		IDR 64,074,468.00	IDR 5,339,539.00	IDR 69,414,007.00	IDR 640,744,680.00	IDR 576,670,212.00
Month 4		IDR 64,074,468.00	IDR 4,805,585.10	IDR 68,880,053.10	IDR 576,670,212.00	IDR 512,595,744.00
Month 5		IDR 64,074,468.00	IDR 4,271,631.20	IDR 68,346,099.20	IDR 512,595,744.00	IDR 448,521,276.00
Month 6		IDR 64,074,468.00	IDR 3,737,677.30	IDR 67,812,145.30	IDR 448,521,276.00	IDR 384,446,808.00
Month 7		IDR 64,074,468.00	IDR 3,203,723.40	IDR 67,278,191.40	IDR 384,446,808.00	IDR 320,372,340.00
Month 8		IDR 64,074,468.00	IDR 2,669,769.50	IDR 66,744,237.50	IDR 320,372,340.00	IDR 256,297,872.00
Month 9		IDR 64,074,468.00	IDR 2,135,815.60	IDR 66,210,283.60	IDR 256,297,872.00	IDR 192,223,404.00
Month 10		IDR 64,074,468.00	IDR 1,601,861.70	IDR 65,676,329.70	IDR 192,223,404.00	IDR 128,148,936.00
Month 11		IDR 64,074,468.00	IDR 1,067,907.80	IDR 65,142,375.80	IDR 128,148,936.00	IDR 64,074,468.00
Month 12		IDR 64,074,468.00	IDR 533,953.90	IDR 64,608,421.90	IDR 64,074,468.00	IDR -
Year-3		**IDR 768,893,616.00**	**IDR 41,648,404.20**	**IDR 810,542,020.20**		

ATTACHMENT 9
PROFIT LOSS

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No.	Description	Year				
		1	2	3	4	5
A.	Revenue					
	Total Revenue	IDR 15,631,742,696	IDR 15,631,742,696	IDR 15,631,742,696	IDR 15,631,742,696	IDR 15,631,742,696
B.	Expenditure					
	Operational Ex.	IDR 10,638,422,116	IDR 10,638,422,116	IDR 10,638,422,116	IDR 10,638,422,116	IDR 10,638,422,116
	Depreciation	IDR 1,112,686,439	IDR 1,112,686,439	IDR 1,112,686,439	IDR 1,112,686,439	IDR 1,112,686,439
	Rate	IDR 632,279,319	IDR 432,043,456	IDR 231,807,594	IDR 66,812,688	IDR 0
	Marketing Fee	IDR 312,634,854	IDR 312,634,854	IDR 312,634,854	IDR 312,634,854	IDR 312,634,854
	Total	IDR 12,696,022,728	IDR 12,495,786,865	IDR 12,295,551,002	IDR 12,130,556,097	IDR 12,063,743,409
C.	Profit before Tax	IDR 2,935,719,968	IDR 3,135,955,831	IDR 3,336,191,694	IDR 3,501,186,599	IDR 3,567,999,287
D.	Tax (10%)	IDR 293,571,997	IDR 313,595,583	IDR 333,619,169	IDR 350,118,660	IDR 356,799,929
E.	Profit after Tax	IDR 2,642,147,971	IDR 2,822,360,248	IDR 3,002,572,524	IDR 3,151,067,939	IDR 3,211,199,359
F.	Profit On Sales	16.90	18.06	19.21	20.16	20.54
G.	BEP : Rupiah	IDR 6,441,381,606	IDR 5,814,537,118	IDR 5,187,692,629	IDR 4,671,171,035	IDR 4,462,011,872

Depreciation is $\frac{In}{P \quad Y}$

Marketing fee is 2% from the total revenue

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ATTACHMENT 10

CASH FLOW

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No.	Component	Year 0	Year 1	Year 2	Year 3	Year 4	Year 5
A.	Cash Inflow						
1	Revenue Before Tax		IDR 15,631,742,696.21	IDR 15,631,742,696.21	IDR 15,631,742,696.21	IDR 15,631,742,696.21	IDR 15,631,742,696.21
2	Credit						
a	CAPEX	IDR 4,933,860,047.73					
b	OPEX		IDR 2,306,680,848.00				
Total Inflow		IDR 4,933,860,047.73					
Total		IDR 4,933,860,047.73	IDR 17,938,423,544.21	IDR 15,631,742,696.21	IDR 15,631,742,696.21	IDR 15,631,742,696.21	IDR 15,631,742,696.21
B.	Cash Outflow						
1	CAPEX	IDR 9,867,720,095.47					
2	OPEX		IDR 10,638,422,115.91	IDR 10,638,422,115.91	IDR 10,638,422,115.91	IDR 10,638,422,115.91	IDR 10,638,422,115.91
3	Fix Installment		IDR 2,002,358,627.93	IDR 2,002,358,627.93	IDR 2,002,358,627.93	IDR 1,233,465,011.93	
4	Rate Installment		IDR 632,279,319.13	IDR 432,043,456.33	IDR 231,807,593.54	IDR 66,812,688.15	
5	Tax		IDR 293,571,996.82	IDR 313,595,583.09	IDR 333,619,169.37	IDR 350,118,659.91	IDR 356,799,928.73
6	Depreciation		IDR 1,112,686,439.09	IDR 1,112,686,439.09	IDR 1,112,686,439.09	IDR 1,112,686,439.09	IDR 1,112,686,439.09
7	Marketing Fee		IDR 312,634,853.92	IDR 312,634,853.92	IDR 312,634,853.92	IDR 312,634,853.92	IDR 312,634,853.92
Total		IDR 9,867,720,095.47	IDR 14,991,953,352.80	IDR 14,811,741,076.29	IDR 14,631,528,799.77	IDR 13,714,139,768.92	IDR 12,420,543,337.66
C	Nett Cash Flow	IDR (4,933,860,047.73)	IDR 2,946,470,191.41	IDR 820,001,619.92	IDR 1,000,213,896.44	IDR 1,917,602,927.29	IDR 3,211,199,358.55

Year	Expenditure	Revenue	Depreciation	Total Net Cash Flow	Present Value	PV Benefit	PV Cost	Initial Payback
0	IDR (9,867,720,095.47)	IDR -	IDR -	IDR (4,933,860,047.73)	IDR (4,933,860,047.73)	IDR 4,933,860,047.73	IDR 9,867,720,095.47	IDR (4,933,860,047.73)
1	IDR (14,991,953,352.80)	IDR 15,631,742,696.21	IDR (1,112,686,439.09)	IDR 2,946,470,191.41	IDR 2,678,609,264.92	IDR 16,307,657,767.46	IDR 13,629,048,502.55	IDR (2,255,250,782.82)
2	IDR (14,811,741,076.29)	IDR 15,631,742,696.21	IDR (1,112,686,439.09)	IDR 820,001,619.92	IDR 677,687,289.19	IDR 12,918,795,616.70	IDR 12,241,108,327.51	IDR (1,577,563,493.63)
3	IDR (14,631,528,799.77)	IDR 15,631,742,696.21	IDR (1,112,686,439.09)	IDR 1,000,213,896.44	IDR 751,475,504.46	IDR 11,744,359,651.55	IDR 10,992,884,147.09	IDR (826,087,989.17)
4	IDR (13,714,139,768.92)	IDR 15,631,742,696.21	IDR (1,112,686,439.09)	IDR 1,917,602,927.29	IDR 1,309,748,601.39	IDR 10,676,690,592.32	IDR 9,366,941,990.93	IDR 483,660,612.22
5	IDR (12,420,543,337.66)	IDR 15,631,742,696.21	IDR (1,112,686,439.09)	IDR 3,211,199,358.55	IDR 1,993,902,154.32	IDR 9,706,082,356.65	IDR 7,712,180,202.33	IDR 2,477,562,766.54
						IDR 66,287,446,032.41	IDR 63,809,883,265.88	

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ATTACHMENT 11

CASH FLOW, REVENUE CHANGE

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No.	Component	Year 0	Year 1	Year 2	Year 3	Year 4	Year 5
A.	Cash Inflow						
	1 Revenue Before Tax		IDR 15,475,425,269.25	IDR 15,475,425,269.25	IDR 15,475,425,269.25	IDR 15,475,425,269.25	IDR 15,475,425,269.25
	2 Credit						
	a CAPEX	IDR 4,933,860,047.73					
	b OPEX		IDR 2,306,680,848.00				
	Total Inflow	IDR 4,933,860,047.73					
	Total	IDR 4,933,860,047.73	IDR 17,782,106,117.25	IDR 15,475,425,269.25	IDR 15,475,425,269.25	IDR 15,475,425,269.25	IDR 15,475,425,269.25
B.	Cash Outflow						
	1 CAPEX	IDR 9,867,720,095.47					
	2 OPEX		IDR 10,638,422,115.91	IDR 10,638,422,115.91	IDR 10,638,422,115.91	IDR 10,638,422,115.91	IDR 10,638,422,115.91
	3 Fix Installment		IDR 2,002,358,627.93	IDR 2,002,358,627.93	IDR 2,002,358,627.93	IDR 1,233,465,011.93	
	4 Rate Installment		IDR 632,279,319.13	IDR 432,043,456.33	IDR 231,807,593.54	IDR 66,812,688.15	
	5 Tax		IDR 293,571,996.82	IDR 313,595,583.09	IDR 333,619,169.37	IDR 350,118,659.91	IDR 356,799,928.73
	6 Depreciation		IDR 1,112,686,439.09	IDR 1,112,686,439.09	IDR 1,112,686,439.09	IDR 1,112,686,439.09	IDR 1,112,686,439.09
	7 Marketing Fee		IDR 312,634,853.92	IDR 312,634,853.92	IDR 312,634,853.92	IDR 312,634,853.92	IDR 312,634,853.92
	Total	IDR 9,867,720,095.47	IDR 14,991,953,352.80	IDR 14,811,741,076.29	IDR 14,631,528,799.77	IDR 13,714,139,768.92	IDR 12,420,543,337.66
C	Nett Cash Flow	IDR (4,933,860,047.73)	IDR 2,790,152,764.44	IDR 663,684,192.96	IDR 843,896,469.47	IDR 1,761,285,500.33	IDR 3,054,881,931.59

Year	Expenditure	Revenue	Depreciation	Total Net Cash Flow	Present Value	PV Benefit	PV Cost	Initial Payback
0	IDR (9,867,720,095.47)	IDR -	IDR -	IDR (4,933,860,047.73)	IDR (4,933,860,047.73)	IDR 4,933,860,047.73	IDR 9,867,720,095.47	IDR (4,933,860,047.73)
1	IDR (14,991,953,352.80)	IDR 15,475,425,269.25	IDR (1,112,686,439.09)	IDR 2,790,152,764.44	IDR 2,536,502,513.13	IDR 16,165,551,015.68	IDR 13,629,048,502.55	IDR (2,397,357,534.60)
2	IDR (14,811,741,076.29)	IDR 15,475,425,269.25	IDR (1,112,686,439.09)	IDR 663,684,192.96	IDR 548,499,333.02	IDR 12,789,607,660.54	IDR 12,241,108,327.51	IDR (1,848,858,201.58)
3	IDR (14,631,528,799.77)	IDR 15,475,425,269.25	IDR (1,112,686,439.09)	IDR 843,896,469.47	IDR 634,031,907.94	IDR 11,626,916,055.03	IDR 10,992,884,147.09	IDR (1,214,826,293.63)
4	IDR (13,714,139,768.92)	IDR 15,475,425,269.25	IDR (1,112,686,439.09)	IDR 1,761,285,500.33	IDR 1,202,981,695.46	IDR 10,569,923,686.39	IDR 9,366,941,990.93	IDR (11,844,598.17)
5	IDR (12,420,543,337.66)	IDR 15,475,425,269.25	IDR (1,112,686,439.09)	IDR 3,054,881,931.59	IDR 1,896,841,330.75	IDR 9,609,021,533.08	IDR 7,712,180,202.33	IDR 1,884,996,732.58
						IDR 65,694,879,998.46	IDR 63,809,883,265.88	

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ATTACHMENT 12

CASH FLOW, OPERATION EXPENDITURE CHANGE

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No.	Component	Year 0	Year 1	Year 2	Year 3	Year 4	Year 5
A.	Cash Inflow						
1	Revenue Before Tax		IDR 15,631,742,696.21	IDR 15,631,742,696.21	IDR 15,631,742,696.21	IDR 15,631,742,696.21	IDR 15,631,742,696.21
2	Credit						
a	CAPEX	IDR 4,933,860,047.73					
b	OPEX		IDR 2,306,680,848.00				
Total Inflow		IDR 4,933,860,047.73					
Total		IDR 4,933,860,047.73	IDR 17,938,423,544.21	IDR 15,631,742,696.21	IDR 15,631,742,696.21	IDR 15,631,742,696.21	IDR 15,631,742,696.21
B.	Cash Outflow						
1	CAPEX	IDR 9,867,720,095.47					
2	OPEX		IDR 10,851,190,558.23	IDR 10,851,190,558.23	IDR 10,851,190,558.23	IDR 10,851,190,558.23	IDR 10,851,190,558.23
3	Fix Installment		IDR 2,002,358,627.93	IDR 2,002,358,627.93	IDR 2,002,358,627.93	IDR 1,233,465,011.93	
4	Rate Installment		IDR 632,279,319.13	IDR 432,043,456.33	IDR 231,807,593.54	IDR 66,812,688.15	
5	Tax		IDR 293,571,996.82	IDR 313,595,583.09	IDR 333,619,169.37	IDR 350,118,659.91	IDR 356,799,928.73
6	Depreciation		IDR 1,112,686,439.09	IDR 1,112,686,439.09	IDR 1,112,686,439.09	IDR 1,112,686,439.09	IDR 1,112,686,439.09
7	Marketing Fee		IDR 312,634,853.92	IDR 312,634,853.92	IDR 312,634,853.92	IDR 312,634,853.92	IDR 312,634,853.92
Total		IDR 9,867,720,095.47	IDR 15,204,721,795.12	IDR 15,024,509,518.61	IDR 14,844,297,242.09	IDR 13,926,908,211.24	IDR 12,633,311,779.97
C	Nett Cash Flow	IDR (4,933,860,047.73)	IDR 2,733,701,749.09	IDR 607,233,177.60	IDR 787,445,454.12	IDR 1,704,834,484.97	IDR 2,998,430,916.24

Year	Expenditure	Revenue	Depreciation	Total Net Cash Flow	Present Value	PV Benefit	PV Cost	Initial Payback
0	IDR (9,867,720,095.47)	IDR -	IDR -	IDR (4,933,860,047.73)	IDR (4,933,860,047.73)	IDR 4,933,860,047.73	IDR 9,867,720,095.47	IDR (4,933,860,047.73)
1	IDR (15,204,721,795.12)	IDR 15,631,742,696.21	IDR (1,112,686,439.09)	IDR 2,733,701,749.09	IDR 2,485,183,408.26	IDR 16,307,657,767.46	IDR 13,822,474,359.20	IDR (2,448,676,639.47)
2	IDR (15,024,509,518.61)	IDR 15,631,742,696.21	IDR (1,112,686,439.09)	IDR 607,233,177.60	IDR 501,845,601.32	IDR 12,918,795,616.70	IDR 12,416,950,015.38	IDR (1,946,831,038.15)
3	IDR (14,844,297,242.09)	IDR 15,631,742,696.21	IDR (1,112,686,439.09)	IDR 787,445,454.12	IDR 591,619,424.58	IDR 11,744,359,651.55	IDR 11,152,740,226.97	IDR (1,355,211,613.57)
4	IDR (13,926,908,211.24)	IDR 15,631,742,696.21	IDR (1,112,686,439.09)	IDR 1,704,834,484.97	IDR 1,164,424,892.41	IDR 10,676,690,592.32	IDR 9,512,265,699.91	IDR (190,786,721.16)
5	IDR (12,633,311,779.97)	IDR 15,631,742,696.21	IDR (1,112,686,439.09)	IDR 2,998,430,916.24	IDR 1,861,789,691.61	IDR 9,706,082,356.65	IDR 7,844,292,665.04	IDR 1,671,002,970.45
						IDR 66,287,446,032.41	IDR 64,616,443,061.96	

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ATTACHMENT 13

CASH FLOW, DISCOUNT FACTOR CHANGE

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No.	Component	Year 0	Year 1	Year 2	Year 3	Year 4	Year 5
A.	Cash Inflow						
1	Revenue Before Tax		IDR 15,631,742,696.21	IDR 15,631,742,696.21	IDR 15,631,742,696.21	IDR 15,631,742,696.21	IDR 15,631,742,696.21
2	Credit						
a	CAPEX	IDR 4,933,860,047.73					
b	OPEX		IDR 2,306,680,848.00				
Total Inflow		IDR 4,933,860,047.73					
Total		IDR 4,933,860,047.73	IDR 17,938,423,544.21	IDR 15,631,742,696.21	IDR 15,631,742,696.21	IDR 15,631,742,696.21	IDR 15,631,742,696.21
B.	Cash Outflow						
1	CAPEX	IDR 9,867,720,095.47					
2	OPEX		IDR 10,638,422,115.91	IDR 10,638,422,115.91	IDR 10,638,422,115.91	IDR 10,638,422,115.91	IDR 10,638,422,115.91
3	Fix Installment		IDR 2,002,358,627.93	IDR 2,002,358,627.93	IDR 2,002,358,627.93	IDR 1,233,465,011.93	
4	Rate Installment		IDR 632,279,319.13	IDR 432,043,456.33	IDR 231,807,593.54	IDR 66,812,688.15	
5	Tax		IDR 293,571,996.82	IDR 313,595,583.09	IDR 333,619,169.37	IDR 350,118,659.91	IDR 356,799,928.73
6	Depreciation		IDR 1,112,686,439.09	IDR 1,112,686,439.09	IDR 1,112,686,439.09	IDR 1,112,686,439.09	IDR 1,112,686,439.09
7	Marketing Fee		IDR 312,634,853.92	IDR 312,634,853.92	IDR 312,634,853.92	IDR 312,634,853.92	IDR 312,634,853.92
Total		IDR 9,867,720,095.47	IDR 14,991,953,352.80	IDR 14,811,741,076.29	IDR 14,631,528,799.77	IDR 13,714,139,768.92	IDR 12,420,543,337.66
C	Nett Cash Flow	IDR (4,933,860,047.73)	IDR 2,946,470,191.41	IDR 820,001,619.92	IDR 1,000,213,896.44	IDR 1,917,602,927.29	IDR 3,211,199,358.55

Year	Expenditure	Revenue	Depreciation	Total Net Cash Flow	Present Value	PV Benefit	PV Cost	Initial Payback
0	IDR (9,867,720,095.47)	IDR -	IDR -	IDR (4,933,860,047.73)	IDR (4,933,860,047.73)	IDR 4,933,860,047.73	IDR 9,867,720,095.47	IDR (4,933,860,047.73)
1	IDR (14,991,953,352.80)	IDR 15,631,742,696.21	IDR (1,112,686,439.09)	IDR 2,946,470,191.41	IDR 2,540,060,509.83	IDR 15,464,158,227.77	IDR 12,924,097,717.93	IDR (2,393,799,537.90)
2	IDR (14,811,741,076.29)	IDR 15,631,742,696.21	IDR (1,112,686,439.09)	IDR 820,001,619.92	IDR 609,394,782.94	IDR 11,616,931,254.61	IDR 11,007,536,471.68	IDR (1,784,404,754.96)
3	IDR (14,631,528,799.77)	IDR 15,631,742,696.21	IDR (1,112,686,439.09)	IDR 1,000,213,896.44	IDR 640,794,707.93	IDR 10,014,595,909.15	IDR 9,373,801,201.22	IDR (1,143,610,047.03)
4	IDR (13,714,139,768.92)	IDR 15,631,742,696.21	IDR (1,112,686,439.09)	IDR 1,917,602,927.29	IDR 1,059,075,026.01	IDR 8,633,272,335.47	IDR 7,574,197,309.46	IDR (84,535,021.02)
5	IDR (12,420,543,337.66)	IDR 15,631,742,696.21	IDR (1,112,686,439.09)	IDR 3,211,199,358.55	IDR 1,528,893,809.70	IDR 7,442,476,151.27	IDR 5,913,582,341.57	IDR 1,444,358,788.68
						IDR 58,105,293,926.01	IDR 56,660,935,137.33	

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ATTACHMENT 14

MINA JAYA NIAGA 11 SHIP PARTICULAR

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Ship Capacity	:
Cargo Hold Capacity	: 311.95 m^3 (± 188.40 tons)
Bait Hold Capacity	: 27.00 m^3 (± 14.34 tons)
Freezer Capacity	:
- Freezer Handling Room	: 40.66 m^3
- Freezer Handling Room Lobby	: 9.09 m^3
- Freezing Room Aft (P)	: 27.61 m^3 (± 2 tons)
- Freezing Room Aft (S)	: 27.61 m^3 (± 2 tons)
- Freezing Room Fwd (P)	: 27.61 m^3 (± 2 tons)
- Freezing Room Fwd (S)	: 27.61 m^3 (± 2 tons)
Fuel Oil Tank Capacity Total (SG : 0.84)	: ± 349.54 m^3 (± 293 tons)
- No. 1 (P)	: 21.79 m^3 (18.30 tons)
- No. 1 (S)	: 21.79 m^3 (18.30 tons)
- No. 2 (P)	: 8.01 m^3 (6.73 tons)
- No. 2 (S)	: 8.01 m^3 (6.73 tons)
- No. 3 (P)	: 14.59 m^3 (12.25 tons)
- No. 3 (S)	: 14.59 m^3 (12.25 tons)
- No. 4 (C)	: 38.13 m^3 (32.03 tons)
- No. 5 (P)	: 20.85 m^3 (17.51 tons)
- No. 5 (S)	: 20.85 m^3 (17.51 tons)
- Stern (P)	: 20.25 m^3 (17.01 tons)
- Stern (S)	: 20.25 m^3 (17.01 tons)
- Deep (P)	: 67.00 m^3 (56.28 tons)
- Deep (S)	: 67.00 m^3 (56.28 tons)
- Service	: 8.19 m^3 (5.20 tons)
LO Storage Tank (SG : 0.9)	: 3.41 m^3 (3.06 tons)
LO Service Tank (SG : 0.9)	: 3.41 m^3 (3.06 tons)
Fresh Water Tank Capacity Total (SG : 1)	: ± 33.76 m^3 (± 33.76 tons)
- Fresh water (P)	: 16.88 m^3 (16.88 tons)
- Fresh water (S)	: 16.88 m^3 (16.88 tons)

Power Plant	:
Main Engine	: 1 unit
Engine	: MAN Bazan - L 20/27 4 Stroke, 800 kW (1088 Hp) 1000 Rpm
Gear Box	: REINTJES, WAF 741 Reduction 3.952

Supercharging	:	ABB, RR-181 Turbo charger speed max 895 /sec
FO Consumption	:	3.5 ton/day
Auxiliary Engine	:	2 units
Engine	:	GUASCOR F – 180 TA 2 X 415 Hp 1500 Rpm
Alternators	:	LE ROY SOMER, LSA M47 1 L9 C6/4 380V, 50 Hz, 256kW/486A
FO Consumption	:	1.6 ton/day unit
Fishing Equipment:		
Main Line (Honen Type)	:	80 sets (Total length 56.000 m) ∅ 7 mm x 50 m x 7 x 2
Branch Line (Red Resin)	:	1040 sets Tetron 38 ply x 30 m with L-Snap & leaden 38 gr. Barrel swivel, snap ring (13 sets/700 m).
Float Line	:	80 sets ∅ 7 mm x 30 m with snap, Snap ring
Sekiyama (Blue Resin)	:	1040 sets Nylon 6 ply x 12 m
Wire Leader	:	1040 sets #30 (3+9) x 3 m with lock, Kanseki Spring, Arma Spring.
Float	:	80 sets 360 mm with Net/Snap, Snap ring

AUTHOR'S BIOGRAPHY

The author named Danuja Wijayanto was born in Salatiga, May 8th, 1995. The author studied Elementary School at SD Kristen 2 Satya Wacana, Junior High School at SMPN 2 Salatiga in 2007 and Senior High School at SMAN 1 Salatiga in 2010. Then the author continued the education at Double Degree at Department of Marine Engineering, Institut Teknologi Sepuluh Nopember - Hochschule Wismar in 2013 with registered number 4213101011. During the study, the author active become member of ITS Student Choir and has won several competition in regional area and international competition in Italy on 2015. The author has elected as the head of ITS Student Choir during 2015/2016 period. On the Job Training experience has already done in PT. Dok dan Perkapalan Kopja Bahari, Pertamina Hulu Energi – Offshore North West Java, and Biro Klasifikasi Indonesia Surabaya. In the 3 years of study, the author joined with the reliability, availability, management, and safety (RAMS) laboratory and completed studies in 8 semesters.

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